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DEPARTMENT OF THE ARMY FIELD MANUAL

TRANSPORTATION RAILWAY BATTALION



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PART ONE

INTRODUCTION

CHAPTER 1

PURPOSE AND SCOPE

1. Purpose

This manual assists transportation railway operating and transportation railway shop battalion officers in the employment of rail units and to provide the basis for the organization, training, and operation of the units. It also serves as a guide for command and staff officers charged with the employment of railway units.

2. Scope

a. This manual describes the organization, functions, employment, and responsibilities of both the railway operating and shop battalions and their organic units, and how they fit into the overall organization of the Transportation Railway Service. The manual also discusses cargo security, defense, military and technical training, and miscellaneous services and functions pertinent to the battalions. References include specific Army manuals applicable to subjects treated in this manual.

b. The concept of the organization and employment of the battalions are based on general and customary requirements. The actual situations under which these battalions operate may vary considerably. Necessary exceptions must be made for the efficient operation of the battalions under different conditions of employment.

c. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded to the Commandant, U. S. Army Transportation School, Fort Eustis, Va.

PART TWO

TRANSPORTATION RAILWAY OPERATING BATTALION

CHAPTER 2

GENERAL

3. Mission

The mission of the transportation railway operating battalion is to operate and maintain a division of a military railway in a theater of operations. It must be ready and capable at all times of furnishing adequate railway transportation to meet theater mission requirements.

4. Assignment

a. The transportation railway operating battalion is normally assigned to a transportation railway group, but it may be assigned directly to a transportation railway command in a theater of operations.

b. In the event the railway operating battalion is required to operate at an isolated location, it will be attached to the supported military command and remain assigned to the railway service command from which it is detached. The supported command will furnish logistical support to

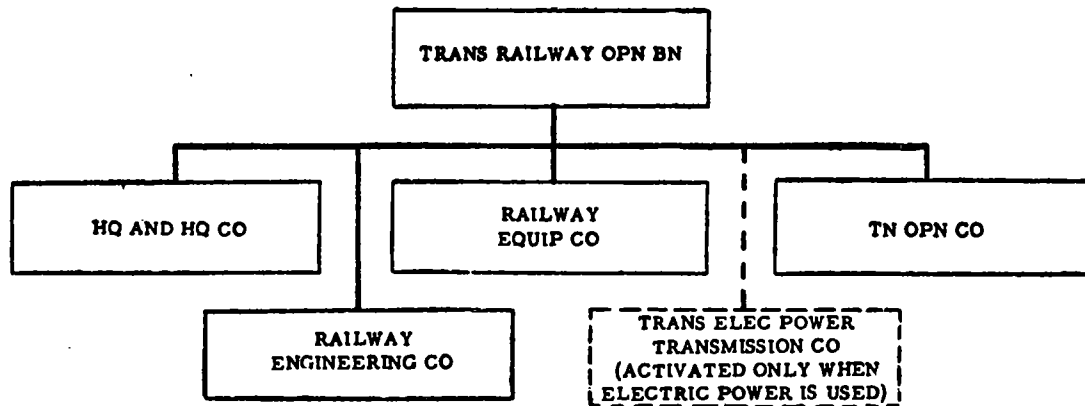


Figure 1. Organization—the railway operating battalion.

the battalion. An organizational chart of the battalion is shown in figure 1.

5. Capabilities

a. The railway mileage which may be assigned to a battalion for operation and the daily tonnage the battalion can deliver are dependent upon a number of factors. Among them are the type, condition, and quantity of motive power and rolling stock; shop and enginehouse facilities; stability of track and roadway; ruling grade and curvature of lines; water and fuel facilities; terminals and yards; and the particular military situation. The friendliness of the natives of a particular area in theaters is also an important factor. To obtain the movement of maximum tonnage, adequate essential facilities are also required. The railway mileage representing the operating jurisdiction of a battalion is assigned by the transportation railway command. For planning purposes this mileage may vary from 90 to 150 miles under phases I, II, and III operation (pars. 113-117).

b. For advance planning, it may be estimated that the operating battalion is able to operate a minimum of 10 trains per day in each direction on a single track main line between terminals 90 to 150 miles apart, and to perform the switching and train buildup that will be involved. Ten trains will normally deliver 4,000 net tons daily. Under stabilized conditions, this may be increased (par. 106).

c. The operating battalion may be assigned

solely to the operation of a large railway terminal where it would be capable of performing switching for a large port, including port clearance to warehouses, dumps, and depots located within an approximate 20-mile radius, and for classifying and building up trains for main track movement.

d. Under phase II operation, the mileage limits of a battalion may increase, depending upon the general situation and the loyalty, efficiency, and capabilities of local civilian personnel and management to meet operating conditions.

6. Organization

a. The railway operating battalion (TOE 55-225) is the basic unit of the transportation railway service. It is organized to assume the operation of the smallest self-contained railway zone (a division) and consists of main line tracks, sidings, yards and terminals, enginehouses, and car repair facilities. The operating battalion performs normal track and roadway maintenance and running repairs to motive power and rolling stock.

b. The organic units of the railway operating battalion consist of headquarters and headquarters company, the railway engineering company, the railway equipment company, and the train operating company. The electric power transmission company is activated and attached when required. Capabilities of the battalion in specific tasks and operations may be increased by attaching augmentation teams from TOE 55-500. The train operating company is the basic unit of the

battalion, and the other companies support and provide facilities for its operation. (The battalion and units are organized under TOE 55-217, 55-225, 55-226, 55-227, 55-228, and 55-229.)

7. Command Responsibilities and Relationships

a. The commanding officer of the railway operating battalion is responsible for its operation and for the efficiency of its performance. The battalion commander normally reports to the commanding officer of the transportation railway group. However, in the absence of a railway group in the particular theater, he may report directly to the commanding officer of the transportation railway command.

b. The individual company commanders are responsible for the performance of their respective companies; they report directly to the battalion commander.

c. The staff officers of the railway group (TOE 55-202) and the transportation railway command (TOE 55-302), in their relations with the operating battalion, exercise technical supervision and assistance over the function of their respective sections.

d. Complete cooperation is essential among all elements of the railway operating battalion, between the battalion and other railway battalions, the battalion and higher headquarters, and between the battalion and other units. Cooperation and coordination of effort are likewise essential between battalion personnel and the transportation officers at the various terminals,

stations, railheads, and depots. Successful mission accomplishment involves mutual functions and problems which must be examined and solved jointly.

e. During a military operation, railway operations are often of an extremely urgent nature. As a consequence, in cases where it is impossible to adhere closely to the established chain of command and communication without entailing serious delays, the battalion commander must often authorize company or detachment commanders to enter into direct communication with the various higher authorities in order to expedite the fulfillment of their missions.

8. Terminology

The parallel between positions on commercial rail systems and military titles in railway operating battalions is shown in table I.

Table I. Comparison of Military and Commercial Titles
BATTALION HEADQUARTERS

<i>TOE designation</i>	<i>Military title</i>	<i>Commercial railway title</i>
Operation superintendent.	Battalion commander.	Division superintendent
Assistant operations superintendent.	Battalion executive officer.	Assistant division superintendent
Chief dispatcher	Officer in charge, train movement section.	Chief dispatcher
Assistant chief dispatcher.	Assistant officer in charge, train movement section.	Night chief dispatcher

Table I. Comparison of Military and Commercial Titles
—Continued

<i>TOE designation</i>	<i>Military title</i>	<i>Commercial railway title</i>
Road foreman of engines.	Road foreman of engines.	Road foreman of engines
Supply officer -----	Battalion railway supply officer.	Division store-keeper
Assistant supply officer.	Assistant railway supply officer.	Assistant division storekeeper

RAILWAY ENGINEERING COMPANY

Maintenance of way superintendent.	Company commander.	Engineer, maintenance of way (division engineer)
Assistant maintenance of way superintendent.	Executive officer ---	Engineer, maintenance of way (assistant division engineer)
Track supervisor --	Platoon leader -----	Track supervisor
Bridge-building supervisor.	Platoon leader -----	Bridge-building supervisor
Signal maintenance supervisor.	Platoon leader -----	Signal supervisor

RAILWAY EQUIPMENT COMPANY

Master mechanic ---	Company commander.	Master mechanic
Assistant master mechanic.	Executive officer ---	Assistant master mechanic
Car foreman -----	Platoon leader -----	General car foreman
Enginehouse foreman or diesel locomotive shop superintendent (supervisor).	Platoon leader -----	Enginehouse foreman

Table I. Comparison of Military and Commercial Titles
—Continued

TRAIN OPERATING COMPANY

<i>TOE designation</i>	<i>Military title</i>	<i>Commercial railway title</i>
Trainmaster -----	Company commander.	Trainmaster
Yardmaster -----	Headquarters section leader.	General yardmaster
Assistant trainmaster.	Platoon leader -----	Assistant trainmaster

TRANSPORTATION ELECTRIC POWER TRANSMISSION COMPANY

Electric power transmission superintendent.	Company commander.	Electrical engineer
Assistant electric power transmission superintendent.	Executive officer ---	Assistant electrical engineer
Electric power transmission officer.	Platoon leader -----	Assistant electrical engineer

CHAPTER 3

BATTALION UNITS

Section I. HEADQUARTERS AND HEADQUARTERS COMPANY

9. Mission

The headquarters and headquarters company exercises command and administration over the organic and attached units of the transportation railway operating battalion and it controls train movements.

10. Assignment and Capabilities

a. Assignment. The headquarters and headquarters company is organic to the transportation railway operating battalion.

b. Capabilities. The capabilities of the headquarters and headquarters company include staff planning, supervision, coordination, and control of the administration, supply and operation of the organic and attached units of the battalion. An organizational chart is shown in figure 2.

11. Functions

a. The functions of the headquarters and headquarters company are to plan, supervise, coordinate, and control operations of the units of the

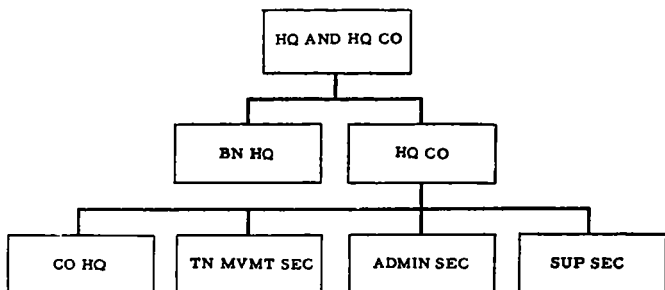


Figure 2. Organization—the headquarters and headquarters company.

battalion; dispatch all main line trains; assign the motive power and distribute the rolling stock in accordance with loading requirements; and staff and operate the stations and towers of the division.

b. Headquarters and headquarters company supplies the technical, administrative, and supply personnel necessary to enable the battalion commander to supervise and coordinate such functions and to operate various activities which are common to all companies of the battalion, including supply and motor transportation and maintenance.

12. Organization

a. The battalion headquarters consists of the battalion commander (railway operations superintendent) and his staff. The staff includes the executive officer (assistant operations superintendent), the adjutant, personnel officer, chief dispatcher, assistant chief dispatcher, supply officer,

assistant supply officer, road foreman of engines, motor-officer-and-the-chaplain.

b. The headquarters company consists of company headquarters and three sections: train movement, administrative, and supply.

13. Battalion Headquarters

a. The commanding officer of the battalion, who is the operations superintendent of the assigned railway division, is responsible for division railway operations and for the training, discipline, messing, housing, and morale of his troops. He insures that the necessary reports are made; that necessary records are maintained for the efficient handling of motive power and rolling stock; and that necessary planning is accomplished, including both operating and emergency.

b. The executive officer, who reports to the battalion commander, is principally concerned with railway administration.

c. The adjutant, who reports to the battalion commander, is in charge of the administrative section of the headquarters company. He is responsible for the military administration of the battalion and handles all matters relating to personnel, battalion orders, battalion records, police, guard, mail and messenger service.

d. The battalion supply officer, who reports to the battalion commander, is the division storekeeper and the fuel agent. He is responsible for maintaining the supply of food, clothing, ammunition and equipment. As division storekeeper he is responsible for maintaining and coordinating the technical supply requirements of the railway

division. He has an assistant supply officer. He checks and approves requests submitted by the companies of the battalion and then prepares requisitions. He exercises technical supervision over both organizational and railway supply matters and has technical supervision over battalion supply personnel. (For details on organizational and railway supply matters of the battalion, see chapter 12.) The battalion supply officer also has in his section a motor officer who furnishes technical supervision over all battalion vehicular maintenance.

e. The road foreman of engines, who reports to the battalion commander, cooperates with the master mechanic to insure proper mechanical condition and performance of motive power and cooperates with the trainmaster concerning the training and assignment of locomotive crews.

14. Company Headquarters

a. The company commander is responsible for the military administration concerned with railway administration and with the coordination of railway and military staff functions.

b. The first sergeant is charged with company administration and performs other related and designated duties. He is assisted by the company clerk.

c. The company headquarters includes the mess steward, cooks, supply sergeant, motor sergeant, and other personnel specified in TOE 55-226. Headquarters company vehicular maintenance is performed by this section. The mess steward supervises operation of the battalion headquarters

mess and any other messes which may be assigned to him. He is responsible for the condition of the mess and is in charge of the receipt, preparation, and distribution of the mess rations.

15. Train Movement Section

a. The chief train dispatcher is chief of the train movement section and reports to the battalion commander. He is responsible for—

- (1) All train movements.
- (2) Issuance of train orders.
- (3) Synchronization of clocks and watches.
- (4) Assignment and distribution of motive power.
- (5) Distribution of motive power.
- (6) Maintenance of locomotive, car, and train movement records.
- (7) Prompt and efficient movement of all traffic.
- (8) Movement of empty equipment over the division to protect loadings.
- (9) Equipment in excess of normal operating needs.
- (10) Reporting of any delays in loading and unloading of cars.
- (11) Furnishing superiors with performance reports of trains hauling high priority freight.
- (12) Insuring that train dispatchers and movement operators issue, copy, and deliver all train orders in the manner specified by the rules.

- (13) Arranging for repairs and/or disposition of equipment bad-ordered as a result of wrecks or derailments.

b. This section is composed of senior train dispatchers, train dispatchers, car distribution clerks, station agents, towermen, and other personnel provided for in TOE 55-226. For operational aspects of train movements, refer to paragraph 81.

16. Administrative Section

a. The administrative section is under the battalion adjutant, who reports to the battalion commander. The section is composed of a sergeant major, who acts as chief clerk for the adjutant; personnel sergeant; personnel administrative supervisor; and other personnel provided in TOE 55-226. This section is responsible for the performance of the dual function of military administration and railway administration. The military function includes the handling of morning reports, payrolls, records, and mail. When directed by the battalion commander, all company clerks report to the adjutant for duties in his office in connection with company records and payrolls of their companies.

b. The railway administration is supervised by the chief clerk, who reports to the operations superintendent. He has charge of the railway office management and supervises the collection of information from station agents, yards, and other sources for the preparation of reports on railway operations. He supervises the preparation and

presentation of reports (par. 54) and maintains all railway records and statistical data on railway operations. Normally, he is assisted by a general clerk, a typist, and other personnel as required.

17. Supply Section

The supply section is under the supervision of the supply officer and is composed of the battalion supply sergeant, supply clerks, transportation supply specialists, truck drivers, and stock clerks as specified in TOE 55-226. The section provides clerical personnel for the division storekeeper's office and personnel for the operation of motor vehicles of the headquarters company. The assistant supply officer acts as assistant division storekeeper. This section is responsible for the receipt, distribution, and storage of supplies for the battalion.

Section II. RAILWAY ENGINEERING COMPANY

18. Mission

The mission of the railway engineering company (TOE 55-227) is to perform roadway, track, and structural maintenance on a rail division.

19. Assignment and Capabilities

a. Assignment. The railway engineering company is organic to the railway operating battalion.

b. Capabilities. The company is capable of performing maintenance and repair to approximately 90 to 150 miles of railway, including track, road-bed, available signals, electrical communications,

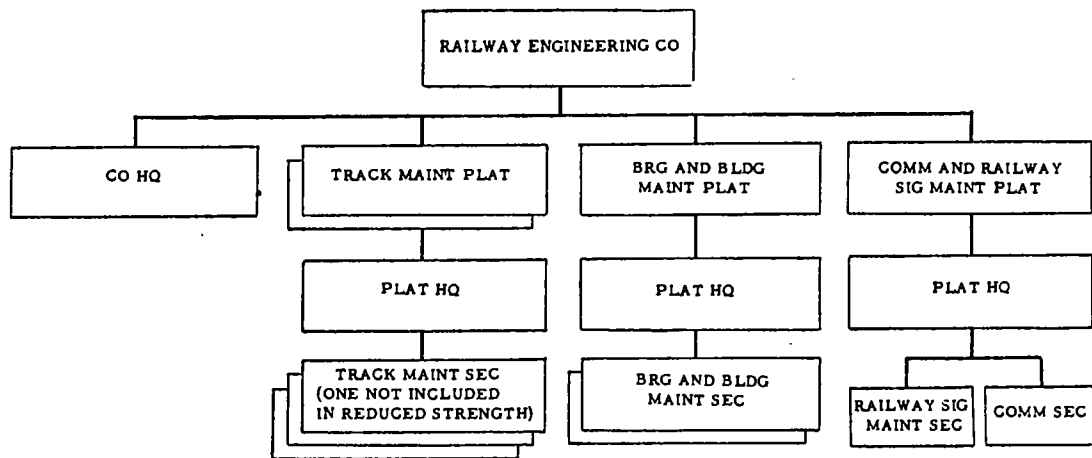


Figure 3. Organization—railway engineering company.

structures, bridges, and buildings located within a railway division.

20. Functions

The duties of the railway engineering company include the repair and upkeep of roadbed, ditches, tracks, switches, bridges, culverts, water lines and tanks, fueling structures, buildings, and signals and communications facilities; and for all railway division roadway and property maintenance not expressly delegated to other agencies. For technical functions, see chapter 10.

21. Organization

The railway engineering company is composed of a company headquarters and four platoons which are described in paragraphs 22 through 25. An organizational chart is shown in figure 3.

22. Company Headquarters

Company headquarters consists of the company commander (a maintenance of way superintendent), who reports to the battalion commander; the executive officer (an assistant maintenance of way superintendent), who reports to the company commander; and enlisted personnel provided in TOE 55-227. The maintenance of way superintendent is directly responsible for all engineering pertaining to maintenance of way, including railway communications and signals. He makes the necessary inspections to insure that proper standards of maintenance are being met, checks and approves all requisitions for materials, and

maintains a sufficient stock of emergency materials on the division. These must often be pre-positioned—rail, fastenings, and ties must be stored at key points along the line which may represent enemy targets. He is responsible for military administration of his company, and for the submission of military and railway reports. His territorial limits conform to those of the battalion unless changed by proper authority.

a. The assistant to the maintenance of way superintendent normally handles administrative and supply matters of the company and performs other delegated duties.

b. The first sergeant has charge of all routine matters of the company, including the preparation of routine reports, organization records, issuing orders, and other assigned duties.

c. The construction surveyor is in charge of surveys, design, drafting, and photography. He is normally assisted by a draftsman, and rodman, and a recorder. When making surveys in the field, additional men from the company headquarters or the platoon are detailed to the survey party.

d. The supply sergeant is in charge of the receipt and issue of maintenance of way supplies of the battalion, and of individual and organizational supplies of the company. Assisted by stock clerks and drivers, he maintains proper stock levels, notes supply requirements of the platoons, and prepares and forwards supply requests. He works under the technical supervision of the division storekeeper.

e. Other personnel of company headquarters include the section foreman, mess steward, cooks, motor sergeant, tractor operators, armorer, mechanics, and the company administration clerk. The latter is charged with the preparation of the records of the company. The administration clerk, truck drivers, crane operators, and automotive wrecker operators report to the first sergeant. Stock clerks normally report to the supply sergeant. Duties are indicated by the titles of personnel.

23. Track Maintenance Platoon

There are two track maintenance platoons in the company. Each has a platoon headquarters, three track maintenance sections, and personnel assigned as provided in TOE 55-227. The platoons are responsible for the safe condition and proper maintenance of the roadbed, track, tunnels, right of way, station grounds, driveways, crossings, and line-of-road markers within the limits of the railway division.

a. Platoon Headquarters. Platoon headquarters is composed of the platoon leader, a section platoon foreman, welders, compressor operators, blacksmiths, and truck drivers. It supervises and coordinates the activities of the track maintenance sections, distributes tools and materials, and prepares and forwards supply requests and other routine inspection reports. The platoon leader, who is a track supervisor, receives instructions from the maintenance of way superintendent. He assigns the territorial limits to the track mainte-

nance sections and prescribes the specific work projects. The platoon leader is responsible for the frequent inspection of track, bridges, culverts, communication lines, signals, fuel and water stations, and highway grade crossings. He examines track maintenance personnel on operational and safety rules. In the event of train accident or line obstruction, the platoon leader proceeds to the site with available track and wrecking forces, with tools and materials to clear the track and make immediate, necessary repairs. He is responsible for all property within his assigned territory, for maintaining an adequate supply of material for repair of all rail facilities, and for discipline, training, and care of platoon personnel.

b. Track Maintenance Section. Each track maintenance section, composed of the section gang foreman, assistant foreman, and section workers, is responsible for all maintenance work within the assigned territory. The gang foreman is responsible for the work, supervision, discipline, and technical training of his men. He has the responsibility for all maintenance of way tools and supplies. Under his direction, inspection is made of track, roadway, bridges, culverts, communication lines, signals, fuel and water stations, and highway grade crossings.

24. Bridge and Building Maintenance Platoon

The bridge and building maintenance platoon consists of a platoon headquarters and two bridge and building maintenance sections. The principal duty of the platoon is structural maintenance to

bridges, culverts, tunnels, fueling and watering facilities, and buildings.

a. Platoon Headquarters. Platoon headquarters consists of the platoon leader, a platoon sergeant, assistant platoon sergeant, water supply specialists, welders, blacksmiths, plumbers, pumping station operators, and truck drivers. The platoon headquarters furnishes technical supervision and coordinates and inspects the work of the bridge and building maintenance sections. Personnel perform the duties indicated by their titles.

- (1) The platoon leader is the bridge and building supervisor and reports to the maintenance of way superintendent. He is responsible for records, reports, and for requisitioning and maintaining records of all material. In addition, he is responsible for the safe condition and functional adequacy of all such structures and facilities. He must have the necessary materials immediately available to repair structures damaged by enemy action, floods, fires, or any other causes. If necessary, he assists the track supervisor in opening the line after any interruption to traffic. The platoon leader supervises the operation and maintenance of fuel and watering stations, and first and second echelon maintenance of stationary boilers in stations and buildings except in shops. He is responsible for the supervision of the work

of his platoon and for the messing, housing, and care of his men.

- (2) Under the direction of the senior water supply specialist, the sources, quality, and quantity of water are determined at all water stations on the division. The senior water supply specialist is charged with the responsibility for maintenance of the water installations, pumps, and water lines. He may request any necessary assistance from the bridge and building supervisor.

b. Bridge and Building Maintenance Section. Each bridge and building maintenance section is organized and equipped to maintain structures. The construction foreman is in charge of the section, supervises the work, and is responsible for the discipline, care, and the feeding of his men. He must insure that there are no delays to the work because of the lack of materials and tools. Included in the section are structural steel workers, construction workers, riggers, welders, and air compressor operators.

25. Communication and Railway Signal Maintenance Platoon

The communications and railway signal maintenance supervisor is chief of the platoon; he reports to the company commander. He supervises all communications and signal maintenance and coordinates with the Signal Corps on all technical matters (par. 47*b*). The platoon is composed of a platoon headquarters and two sections which may

be combined when necessary to expedite the restoration of services of either communications or signals. Chapter 8 gives details on maintenance and construction of railway signals and communication lines.

a. Communications Section. The communication section consists of a wire foreman, wire team chiefs, and wiremen. The section is responsible for the maintenance of land line communications of the railway division. The duties of the section include the repair of communication-line poles, crossarms, and insulators, and the maintenance of telephones, telephone connections, drops, and wire lines over the entire railway division.

b. Railway Signal Maintenance Section. The railway signal maintenance section consists of a special electrical device repair supervisor and special electrical device repairmen. The section is responsible for the maintenance and repair of signal devices, lines, radio, and equipment.

Section III. RAILWAY EQUIPMENT COMPANY

26. Mission

The mission of the railway equipment company is to operate enginehouses, car shops, and car-repair tracks. It performs maintenance, running repairs, and inspection of locomotives, rolling stock, and special equipment operating on the railway division.

27. Assignment and Capabilities

a. Assignment. The railway equipment com-

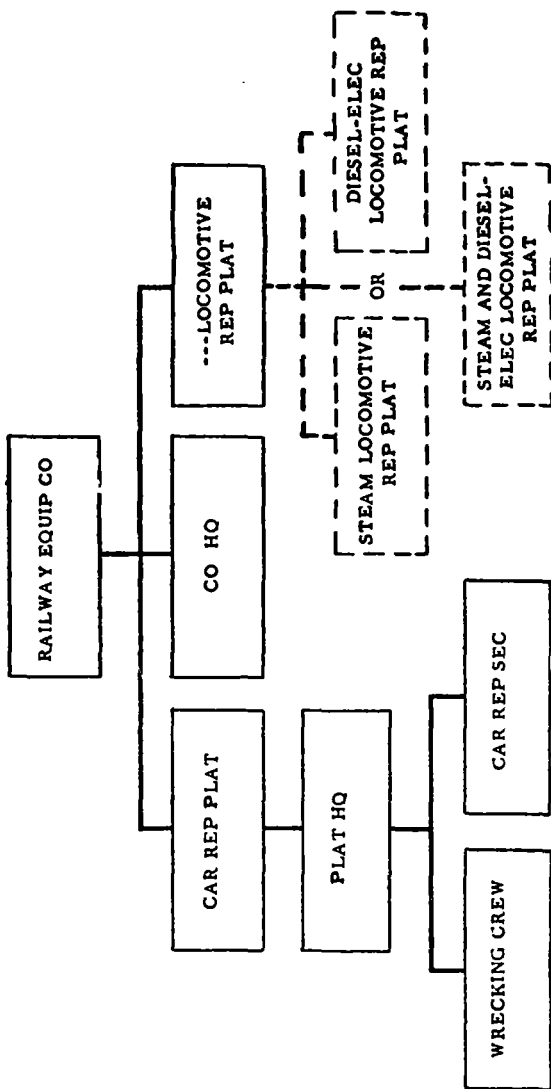


Figure 4. Organization—railway equipment company..

pany is organic to the transportation railway operating battalion.

b. Capabilities. The railway equipment company is capable of performing maintenance and running repairs on approximately 40 locomotives and 800 cars, and making daily inspection on approximately 2,000 cars.

28. Functions

The railway equipment company is responsible for—

a. Running repairs, tests, and inspections of locomotives, rolling stock, and special railway equipment.

b. Boiler washing.

c. Light repair to tools and limited repairs to mechanical equipment within the battalion.

d. Maintaining the necessary level of supplies of lubricants, greases, oil, kerosene, and spare parts for maintenance and running repairs to equipment.

e. Operation of fueling, watering, lubricating, and ash pit facilities.

29. Organization

The railway equipment company is composed of a company headquarters, one car repair platoon, and one locomotive repair platoon. For complete details of organization and equipment, refer to TOE 55-228. An organizational chart for this company is shown in figure 4.

30. Company Headquarters

The company headquarters supervises the technical operations of the two platoons; administers the company, procures, stores, and issues tools and materials which the company uses (and for which it is responsible); and operates the drafting room.

a. The company commander (a master mechanic), who reports to the battalion commander, is responsible for the military administration of the company, maintains an adequate supply of materials, assigns personnel, and insures cooperation with other departments to facilitate the function of the battalion in accomplishing its mission. He prescribes rules and regulations for the protection of enginehouses and other facilities from fire or other damage. He makes periodic inspections to see that rules are being observed, and he is responsible for the operational performance of the company.

b. The assistant master mechanic has direct charge of the drafting room and also is responsible for the procurement, storage and issue of tools, materials, and supplies. He sees that all rules governing equipment inspection, tests, and boiler washing are followed. He maintains a record of the condition of locomotives and cars, and performs such other duties as prescribed by the master mechanic. Personnel under his direction include a first sergeant, a supply sergeant, a mess steward, a supply specialist, a draftsman, and a clerk.

c. The first sergeant is responsible for the

routine administrative matters of the company. He keeps railway records, organization records, administers company orders, and performs other assigned duties.

d. The supply sergeant is in charge of procurement, receipt, storage, and distribution of railway supplies, materials, tools, individual equipment, and organizational equipment. He is assisted by the supply specialist. Other personnel perform duties that are indicated by their titles.

31. Car Repair Platoon

The car repair platoon is composed of platoon headquarters, a wreck crew, and a car repair section. It is charged with maintenance, repair, and inspection of cars (pars. 146 and 147) and operation of the wreck train.

a. Platoon Headquarters. Platoon headquarters supervises the car repairs and inspects for defects of all cars passing over the division. The headquarters is composed of the car foreman, car shop foreman, and the car inspectors. The platoon leader (a car foreman), who reports to the company commander, is responsible for the operation of the car repair shop. He is responsible for the discipline and training of his men, inspecting and testing air brakes and air equipment, car inspections, and the supply of car parts and repair materials. He represents the equipment company at wrecks, and makes certain that damage to equipment is held to a minimum when clearing up wrecks. The car shop foreman assists the

platoon leader, coordinates the car repair work, and requisitions repair materials.

b. Wreck Crew. The wreck crew operates equipment assigned to the wreck train, supervises the clearing of wrecks, and assists in the removal of other line obstructions. It works under the battalion commander or his assistant while engaged in wrecking operations. The wreck foreman is responsible for equipment and materials of the wreck train and for the efficient employment of the crew while engaged in wrecking operations. When not employed in wreck work, wreck crew personnel are attached to the car repair section. The personnel consists of the wreck foreman, car repairman, crane operator, electrician, boiler repairman and welder.

c. Car Repair Section. The car foreman is in charge of the car repair shop and supervises the work. The personnel of the section are assisted by wreck crew members when they are available. The foreman advises the supply sergeant of the material requirements of the shop. The occupational titles of the following personnel indicate their normal duties although, when required, they may be assigned other additional duties: car repairmen, air brake repairmen, blacksmiths, metal workers, and welders.

32. Locomotive Repair Platoon

The use of steam power, diesel-electric power, or a combination of the two is a basis for the organization of the three types of locomotive repair platoons. The type of platoon assigned to

the company depends on the type of motive power operating on the division. The platoon is charged with the operation of enginehouses; maintenance and running repairs to locomotives, cranes, and other special equipment; fuel and cinder handling; and boiler washing. The platoon is organized to operate a 24-hour day. The platoon leader is designated the enginehouse foreman or diesel locomotive shop superintendent, depending upon the type of platoon activated. He is responsible for all facilities used in connection with servicing the motive power. Repair facilities, materials and tools, inspection of locomotives, and administrative matters of the platoon are likewise his responsibilities. He supervises the dispatch of locomotives after making certain that all have been properly inspected, supplied, and ready for road and yard service. He conducts inspections to see that safety rules and regulations are being followed by personnel under his jurisdiction.

a. Steam Locomotive Repair Platoon. The platoon leader is the enginehouse foreman. He has to assist him a steam locomotive shop foreman who, in turn, has an assistant. The shop foreman is responsible for proper shop practices and procedures; maintaining a dispatch record; and supervising periodic locomotive tests on a monthly, quarterly, or other basis as required. He acts as administrative assistant to the platoon leader. The function of the other personnel listed in TOE 55-228 is indicated by their occupational titles.

b. Diesel-Electric Locomotive Repair Platoon. The platoon leader is the diesel locomotive shop superintendent. He is assisted by the diesel-electric locomotive shop foreman. Additional personnel for mechanical and diesel-electric work on motive power are provided in TOE 55-228. The shop foreman, who reports to the platoon leader, is charged with the responsibility for the repair of diesel-electric locomotives. The platoon is capable of operating on a 24-hour basis

c. Steam and Diesel-Electric Locomotive Repair Platoon. The platoon leader is the enginehouse foreman. An assistant diesel foreman and a steam locomotive shop foreman provide supervision for around-the-clock service. The platoon leader is responsible for the operation of repair facilities for both steam and diesel power and for shop performance including inspections, records, and reports required on both types of power. Personnel are provided in TOE 55-228 and include both steam and diesel technicians.

Section IV. TRAIN OPERATING COMPANY

33. Mission

The mission of the train operating company is to provide road and yard personnel for the operation of locomotives and trains.

34. Assignment and Capabilities

a. Assignment. The train operating company is organic to the transportation railway operating battalion.

b. Capabilities. The company is capable of operating the trains and locomotives in both yard

and road service, and of performing incidental switching and train service for a railway division 90 to 150 miles long. It can perform the necessary switching and train build-up in a large terminal, including port clearance up to a 20-mile radius of a large port. The company can provide an average of 40 train crews daily for road and/or terminal operation, and do the switching, classifying, and making up of trains for the road.

35. Function

The train operating company operates the road trains and yard switching crews of the operating battalion within the assigned limits of the division, including the switching at stations, depots, docks, and at service installations.

36. Organization

The organization of the train operating company consists of the company headquarters and two train operating platoons of 25 crews each. Each of the train operating platoons has a platoon headquarters. An organizational chart is shown in figure 5.

37. Company Headquarters

The company headquarters is staffed by the company commander, the executive officer, and yardmasters. The noncommissioned personnel consist of a first sergeant, senior assistant yardmasters, assistant yardmasters, mess steward, supply sergeant, and additional enlisted personnel shown in TOE 55-229. The company provides

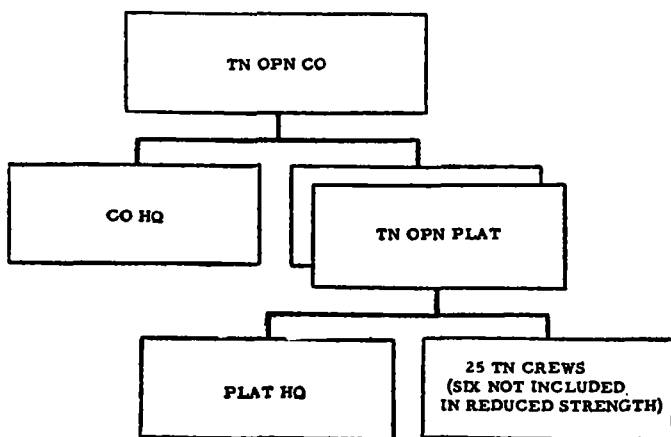


Figure 5. Organization—train operating company.

personnel for supervision, inspection, and administration of the company and for the operation of the yards and terminals. The company commander is trainmaster for the division and is responsible to the battalion commander for the operation of road trains and yard switching. He is responsible for the operation of wayside stations, and for military administration of the company including housing, messing, and care of company personnel. The company headquarters is responsible for records and reports detailed in paragraphs 54 through 64.

a. The company commander is responsible for policing the compliance of all operating and safety rules by personnel of the company. In the absence of instructions from higher authority, he prescribes rules and regulations required for safe

and efficient yard service and road movements. He insures the prompt and regular movement of trains over the division, and he investigates train delays and accidents. He analyzes delays and, where possible, takes steps to preclude their re-occurrence. He inspects the condition of passenger equipment and sees that such cars are properly and fully used. He coordinates with the train movement section of the headquarters company and makes constructive recommendations to expedite train movements. His technical duties and responsibilities are further outlined in paragraph 80.

b. The executive officer assists the company commander in the performance of the latter's duties and performs assigned tasks. He acts for the company commander in his absence.

c. The yardmasters, who report to the trainmaster, supervise the breaking up of trains and the building up of trains for forwarding. He assigns tracks for loading and unloading, coordinates car inspection, and orders bad-order cars to the car shop or rip track. It is the yardmasters' responsibility to notify car dispatchers sufficiently in advance of the need for yard and road crews. They maintain or supervise the compilation of records and reports.

- (1) Under the supervision of the yardmaster, an assistant yardmaster is provided for each 8-hour shift to insure 24-hour yard operations. Each yardmaster is entirely responsible for the operation and personnel performance

during his shift. Yard clerks assist the yardmasters in various functions.

- (2) Yard conductors report to and receive their instructions from the yardmaster in charge of the yard to which they are assigned. The conductor and his crew members are drawn from the operating platoon.

d. The first sergeant has immediate charge of all routine administrative matters of the company, including all reports. He keeps organization records, issues company orders and directives, and performs other assigned duties. The company clerk and a general clerk assist the first sergeant in clerical duties. Yard clerks report directly to the yardmaster.

e. The supply sergeant, under the technical supervision of the division storekeeper, is charged with the preparation of requisitions, and with the receipt and issue of supplies and equipment.

38. Train Operating Platoon

There are two train operating platoons, each composed of a platoon headquarters and 25 train crews. The platoons are charged with road-train movements and with yard switching operations.

a. Platoon Headquarters. Each platoon headquarters in the company includes a platoon leader who is the assistant trainmaster and who reports to the company commander. The enlisted personnel consist of a senior assistant and an assistant road foreman of engines, senior and crew dispatches, and of 25 train crews as provided in

TOE 55-229. The platoon leader is responsible for the discipline, messing, housing, and general care of the personnel in his platoon. He supervises operations in his assigned territory. He must make certain that safety and operating rules, regulations, and special instructions are carried out.

- (1) The assistant road foreman of engines coordinates technical aspects of operation with the road foreman of engines in battalion headquarters. They work with the master mechanic on matters to insure the proper mechanical condition of motive power, and to insure immediate availability of locomotives when needed. They ride engines and instruct engineers and firemen in technical aspects of proper locomotive firing and/or handling. Both must do anything possible to see that engine failures and delays are held to the minimum. Water and fuel deficiencies are reported to the trainmaster. The road foreman of engines keeps the trainmaster and the master mechanic informed of the condition of engines when received from enginehouses, and of the performance during the assigned tour of duty.
- (2) The crew dispatchers are charged with maintaining the crew roster, or crew board, and with the dispatch of train crews. Under the direction of the platoon leader, they perform administrative

and clerical duties pertaining to the operation and performance of train crews.

b. *Train Crews.* The train crews operate either freight or passenger trains, or perform switching operations in yards and terminals. The train conductor is responsible for the prompt movement of passenger and freight trains, and for the safety of the train en route. When such trains are regularly scheduled in the timetable, the conductor must see that the train adheres to the schedule. The brakemen report to and receive their instructions from the conductor. The engineer is responsible for the efficient operation of the locomotive; for observing instructions, rules and signal aspects along the road. He supervises the fireman, and they both call and repeat signal aspects to make certain that each is reading the signals in an identical manner. All members of the train and engine crew are responsible for strict observance of and compliance with the operating rules of TM 55-200. Each member of the crew must have a current copy of the timetable with him while on duty.

Section V. TRANSPORTATION ELECTRIC POWER TRANSMISSION COMPANY

39. Mission

The mission of the transportation electric power transmission company is to maintain and repair electric power and transmission facilities of the transportation railway operating battalion.

40. Assignment and Capabilities

a. Assignment. The electric power transmission company is attached to the railway operating battalion only when electric motive power is operated by electrified catenary or a third-rail system.

b. Capabilities. The company has the capacity to maintain and repair electrified power transmission facilities including substations, catenary and/or third rail for 200 miles of electrified railway.

41. Functions and Organization

a. Functions. The company is responsible for the maintenance of the electric power supply system for the operation of an electrified railway including the necessary substations. It is not responsible for the actual generation of power.

b. Organization. The electric power transmission company is composed of the company headquarters and two electric power platoons. An organizational chart is shown in figure 6.

42. Company Headquarters

The company headquarters consists of the company commander (electric power transmission superintendent), executive officer (assistant electric power transmission superintendent), high voltage line construction supervisor, first sergeant, mess steward, supply sergeant, and additional enlisted personnel as shown in TOE 55-217. The headquarters is responsible for normal administration, discipline, mess, and supply of the company. It supervises the electric power platoons.

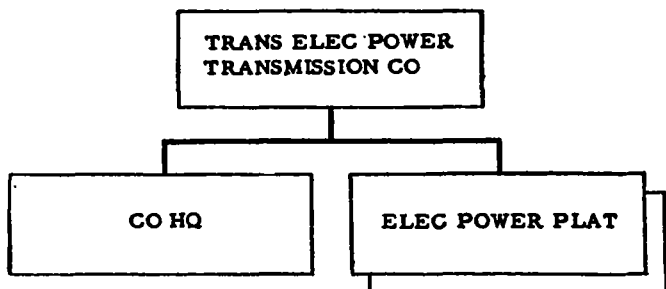


Figure 6. Organization of the transportation electric power transmission company.

a. The company commander reports to the battalion commander. He is responsible for seeing that an adequate quantity of materials and supplies is maintained. He must cooperate closely with other departments of the battalion to facilitate all operations.

b. The executive officer is responsible for administration and the personnel functions of the company. The high voltage line construction supervisor assists in the planning and execution of high voltage line construction, rehabilitation, and maintenance projects. The first sergeant has immediate charge of routine matters of the company. He prepares reports, keeps organization records, issues company orders as directed, and performs other assigned work. He is assisted by the company clerk. The mess steward is charged with the operation of the company mess, the supply and handling of rations, and the inspection functions of outside company messes as assigned.

The supply sergeant is in charge of procurement, receipt, storage, and distribution of electrical supplies, materials, and tools, in addition to organizational supplies. Other company personnel are assigned, and their duties are indicated by their occupational titles, as they may be required.

43. Electric Power Platoon

There are two electric power platoons in the company. Each is headed by an electric power transmission officer who reports to the company commander. Included in each platoon is a construction foreman, senior cable splicer, substation operator, and additional technical personnel as shown in TOE 55-217. The platoon is responsible for the operation, maintenance and repair of electrical transmission systems. It is organized for 24-hour operation.

a. The line construction foreman reports to the electric power transmission officer and supervises the work of the line teams, cable splicers, and the third-rail repairmen.

- (1) The high voltage line teams perform the repair and maintenance of all power and distribution lines other than multiple conductor power cables, although these teams may assist in the repair of power cables should it be necessary.
- (2) The cable splicers perform repair and maintenance of all high power multiple conductor cables for operation of substations and power distribution.
- (3) The third-rail repairmen maintain and

repair lines supplying power to the third rails.

b. The substation supervisor, who reports to the electric power transmission officer, supervises the activities of the substation operators and electricians. He is charged with the responsibility for proper load and distribution of electric current over the railway division.

- (1) The substation operators control the input of electricity into the substation, and the output into the distribution lines.
- (2) The substation electricians inspect, test, and maintain substation panel boards and other electrical equipment.

Section VI. TRANSPORTATION RAILWAY SERVICE SUPPLEMENTAL TEAMS

44. Mission

The mission of the transportation railway teams (TOE 55-500) is—

a. To be phased into units of the battalion for direct augmentation of its normal strength.

b. To provide personnel for a specific task when one or more teams of trained personnel are required for a specific task, or to form an organization for a mission or operation for which no TOE unit is prescribed.

45. Assignment

Teams made available to the transportation railway service are under the direction of and/or subject to assignment by the transportation railway command in the theater. The teams are normally assigned to the battalion and the specific

units with which they are working. Teams performing functions which are common to two or more battalions may be assigned to the railway group.

46. Organization, Functions, Capabilities

The augmentation teams are organized under TOE 55-500. Table II shows the railway service teams by types. The title of each team is shown with its functions and capabilities.

*Table II. Military Railway Service Teams
(TOE 55-500)*

OPERATING TEAMS

<i>Title</i>	<i>Functions and/or capabilities</i>
Terminal detachment -----	Terminal operation, supervising switching and classifying 10 trains per day.
Station detachment -----	Operation of a small station on line of road, at an Army supply point, or at a depot.
Yard operating detachment--	Supervision and administration of yard operations and car repairs (adaptable to expansion).
Train operating section ----	Performance of switching or train operation by six train crews, with trainmaster and assistant.

MAINTENANCE OF WAY TEAMS

Maintenance of way crew --	Maintenance of tracks, structures, and communications and signals for approximately 40 miles of track within large terminal area.
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*Table II. Military Railway Service Teams
(TOE 55-500)—Continued*

MAINTENANCE OF WAY TEAMS—Continued

<i>Title</i>	<i>Functions and/or capabilities</i>
Section crew -----	Track maintenance to approximately 15 miles of track.
Bridge and building maintenance crew.	Maintenance to bridges and buildings on 45 to 75 miles of track.
Railway communications and signal maintenance crew.	Maintenance of communications and signals on 90 to 150 miles of track.

MAINTENANCE OF EQUIPMENT TEAMS

Steam locomotive maintenance crew.	Field maintenance and running repairs to 15 steam locomotives.
Steam locomotive maintenance crew.	Field maintenance and running repairs to seven steam locomotives.
Diesel-electric locomotive maintenance crew.	Field maintenance and running repairs on 15 diesel-electric locomotives and 50 railway cars.
Diesel-electric locomotive maintenance crew.	Field maintenance and necessary running repairs on 7 diesel-electric locomotives and 25 railway cars.
Car repair crew -----	Inspection and necessary running repairs to 500 to 650 cars per day.
Car repair crew -----	Inspection and running repairs to 300 to 350 cars per day.
Ambulance train maintenance section.	Maintenance and running repairs to four ambulance trains.

*Table II. Military Railway Service Teams
(TOE 55-500)—Continued*

MAINTENANCE OF EQUIPMENT TEAMS
—Continued

<i>Title</i>	<i>Functions and/or capabilities</i>
Ambulance train maintenance crew.	Riding ambulance trains; making running repairs; and operating steam heat, lights, water and other services.
Railway workshop (mobile).	Maintenance and running repairs (and in some cases, heavy repairs) on 5 steam and 15 diesel locomotives and 100 cars in forward areas or outlying points.

CHAPTER 4

OPERATIONAL TECHNIQUES AND CONTROL

Section I. GENERAL

47. Relation to Other Arms and Services

a. Cooperation between railway organizations and other military organizations is extremely important to assure a constant flow of supplies and personnel over the railway system.

b. Construction, rehabilitation, and major maintenance—requiring major items of construction equipment—of railways in theaters are functions of the Corps of Engineers. Maintenance not requiring major items of equipment is the responsibility of the transportation railway service (par. 132). Construction of new and major rehabilitation of wire circuits for railway communications are responsibilities of the Signal Corps. When completed circuits are allocated for its exclusive use, the maintenance is then the responsibility of the railway service (par. 119). The military police, or other troops attached to the railway service for security purposes, furnish train guards for cargo in transit and guards for yards and terminals. The operating battalion cooperates fully with these services in the performance of such functions. Under such conditions, close coordination

of plans and working arrangements are vitally necessary.

c. Protection of the railways in the combat zone is normally afforded by combat troops. Overall security in the communications zone is the responsibility of the area commanders in which the battalion performs its part according to plans. When a line is subjected to frequent raids, it may be protected by guard cars or by armored trains, manned and commanded by personnel from the arms and operated by train crews of the railway operating battalion.

d. The railway operating battalion controls all train and switching movements over the railway division. This includes scheduling, routing, dispatching, and the management of all railway operations and maintenance. Complete observance of all safety rules, and all operating rules (TM 55-200), is a vital factor in efficient operations.

48. Support

a. The railway operating battalion is normally engaged in the movement of supplies, materials, and personnel for the support of the combat forces. These may include part of a field army, or one or more armies, depending on the situation.

b. The battalion assignment may include a railway division which serves the railheads or a portion of the railway system intermediate between the base section and the railheads. The assignment may be for the operation of a large terminal, including a port as well as the usual depots and service installations. Regardless of the type of assign-

ment, the operation of the battalion in any of these cases is to support the combat forces.

c. The battalion supports the administrative and technical services in their direct support of the combat forces and the military mission. This is accomplished by furnishing rail transportation for the movement of materials and supplies into and out of the various depots and installations.

d. Besides military movements, the theater commander may direct that an allocation of rail transportation be made for the support of the civilian population. Instructions for these movements will come to the battalion through regular command and movement control channels.

49. Employment and Distribution of Personnel and Facilities

a. The personnel of the operating battalion will be distributed to meet the operational requirements. The physical characteristics of the division will have a direct bearing upon the type of train operation, and on the method of dispatch, which will be employed. Normally, there will be at least one yard or terminal on the division. Often there is a large yard at each end of the division limits. There may be a classification yard near the end of the line suitable for the building up of trains for the railheads. Way stations will generally be located from 5 to 10 miles apart.

b. The battalion headquarters and the dispatching office are generally located at the main terminal on the division. Enginehouse facilities must often be augmented or altered if a different type

of motive power is planned. Station personnel are assigned to the various stations along the line. Enginehouses, and points along the line where engines are capable of being turned, are staffed with appropriate personnel. Car repairmen are assigned to shops and rip tracks at the various points, and maintenance-of-way personnel are stationed at key points where each group will be equally spaced from the next.

c. The distribution of personnel is left to the judgement of the battalion commander. Frequent changes may be necessary to meet emergencies or unusual development at stations or at other points of personnel assignments. Such changes may be necessary because of additional track construction, yard layout expansion, new depots, or troop concentrations which may increase station work. The following table is shown for information only as an example of how a battalion may distribute personnel in a hypothetical situation. Under this plan, detachments shown at Stations B, C, D and E are normally under the control of the ranking non-commissioned officer. He is responsible for administration, sanitation, discipline, mess, and the necessary defense measures against all types of enemy attacks including guerilla operations.

- (1) *Terminal A.* Terminal A represents a battalion headquarters and includes all personnel not stationed at other points. Battalion headquarters and shops normally are located at the principal terminal on the division.
- (2) *Station B.* Personnel at Station B con-

sist of a sergeant, who is the section gang foreman (railway engineering company) and is in charge of the track maintenance section; one corporal, who assists the sergeant; 15 section hands; 3 station agents (headquarters company); and 1 cook—a total of 21 personnel.

- (3) *Station C.* Station C personnel are the same as those at Station B, except that additions have been made of 2 cooks, 3 towermen, 1 car inspector, and 1 water supply helper—total personnel, 28.
- (4) *Station D.* The personnel at Station D are the same as at Station B.
- (5) *Station E.* Station E personnel are the same as Station B.
- (6) *Terminal F.* Assignment of personnel to Terminal F depends on the particular situation. If Terminal F is at the end of the line, it will require identical personnel to Station C plus inspectors and emergency repairmen as required. When the battalion is an intermediate one, the activities at Terminal F will be performed by the adjacent battalion.

50. Dispersion of Operations

a. In warfare, it may be necessary to disperse operations to avoid heavy accumulations of equipment in terminals, ports, and yards. Instead of working a large port to full capacity in one area, the Army may disperse operations by moving part of the operations to adjacent ports and beaches.

Instead of one large terminal at traffic-originating points, the cars will be assembled and trains made up in several small yards. Heavy concentrations of equipment at any given point should be avoided.

b. The battalion commander should make preliminary surveys in his area and be prepared to recommend yard and track construction necessary for dispersion. His plans should include proposed routes to beaches and satellite ports with facilities to meet actual requirements, the reduction of large terminal operations, and the construction of small yards sufficiently dispersed to preclude the enemy damaging an entire operation.

c. Consideration must also be given to the use of alternate routes, if available, and the possible use of a branch line needing minimum construction to obtain an alternate route. Plans for alternate routes should be submitted to the railway group for review. The battalion must be kept fully informed on the locations of alternate Army supply points and railheads.

d. The battalion commander will keep fully informed on the theater plan for dispersion and the degree of concentration to be permitted in the theater.

51. Safety Rules and Maintenance Standards

a. Arbitrary safety rules, as such, often become secondary to military necessity; however, every effort consistent with efficient operations will be made to provide safety for both personnel and equipment. As operating conditions improve, normal safety standards must be observed. Main-

tenance standards will be such as conditions permit, based on military necessity and accomplishment of the mission. As operations become stabilized, it will be possible to improve both operational practices and maintenance standards, and constant efforts must be made towards this end.

b. Safety conditions on many foreign railroads, and safety devices on much of their equipment, do not compare favorably with the standards on United States railroads. In many foreign countries, clearances on bridges, buildings, tunnels, and overhead lines and obstructions are often insufficient to provide clearance for personnel riding the sides and tops of cars. Often, there is a lack in use and uniformity of standard safety devices on foreign equipment. This is particularly true as to the number and location of grab irons, ladders, sill steps, braking devices and couplers.

c. The battalion commander must make certain that all personnel are familiar with these conditions and that all necessary safety precautions are taken. He also coordinates with movement control personnel in preparing written instructions to be given to the troop movement officer. As a precaution against personal injuries, instructions must warn against the practice of troops' riding on the tops of cars, leaning out of car windows and doors, and riding with feet hanging out of car doors.

d. Gasoline and other flammable articles should, insofar as possible, be run in trains separate from those hauling ammunition and other explosives. When this is impossible or impractical, such cars

must be separated the greatest distance possible within a given train.

Section II. PLANS, ORDERS, AND REPORTS

52. Plans

It is necessary for the battalion commander, with his staff, to make definite plans for current operations and to insure that those in the battalion who are responsible for the execution of such plans be completely familiar with them. While plans should be firm, they must be sufficiently flexible so as to be adaptable to changing requirements and operating conditions. Rail lines can usually be opened with the minimum of rehabilitation. Future construction and additions should always be planned with a view as to the length of the planned operation. Conversely, it must not be assumed that given lines will have no future use beyond the immediate period of occupancy. The battalion commander constantly estimates the situation and prepares plans for expansion and improvement of terminals, yards, railheads, main track, and other facilities which will increase battalion efficiency and capability. Higher headquarters must be kept fully informed on all such requirements, and on the improvements that are within the capabilities of the battalion. The necessity for improvements beyond this scope must be fully explained and recommended through normal command channels. Plans must be made for the dispersal of operations if required, for demolition of track structures and equipment should it prove necessary, and for the resumption of rail service

on entering a theater of operations as described in chapter 6.

53. Orders

Through orders to his staff and company commanders, the battalion commander puts his plans into effect. Orders are issued personally by the commander or by the staff in the name of the commander. Such orders may be verbal or written, or they may be bulletined special instructions or operational orders. Oral or bulletined special instructions are fragmentary orders of the operation order. FM 101-5 contains complete explanations of operation, administrative, and fragmentary orders. Orders should be clear, concise, and complete. Verbal orders given over vocal communications should be confirmed by teletype message or in writing. (Extensive use should be made of teletype communications when the facility is available. The method is expeditious, easily accessible, and gives both the originator and the recipient a permanent record of the information or instructions.)

54. Routine and Special Reports

a. Various routine and special telephonic, teletype, and written reports are made by the personnel wherever a battalion operates—at yards, stations, enginehouses, or any outlying areas where personnel are assigned or located. Such reports are necessary for the proper operation and administration of the battalion and the railway service. They are also used to convey information required by the transportation officer.

b. These reports are consolidated in battalion headquarters and are transmitted in the prescribed manner to the next highest echelon. At the highest railway service echelon the reports are consolidated and forwarded to the transportation officer at a designated time, usually at 0800 hours.

c. The reports are important to all concerned because they reflect the progress of operations, the current situation, and the required statistical information. They are indispensable to battalion operations and become a part of the battalion records. Specific reports are treated in paragraphs 55 through 64.

d. A number of routine reports are compiled by the battalion which are described in the following paragraphs but which are not specifically referred to by name. These include station records of trains arriving and departing, train register, car record book, and others of which the printed forms are self-explanatory. Refer to the appendix for a list of the railway service forms which cover routine, daily matters.

55. Daily Installation Situation Report (DA Form 1322)

a. The daily installation situation report is prepared at a specified time, normally 1800 hours daily, by all terminal, yard, and station agencies. The report reflects the situation as of the hour of its compilation and the progress of operations over the preceding 24 hours for the entire railway division. The report is forwarded to the local field transportation officer and to the battalion headquarters immediately upon its completion.

b. This report, which is retained as a permanent station record, is obtained by a thorough physical check of all yards, stations, and terminals, including all depots, service installations, piers, quays, other loading and unloading tracks, and of any other track where cars may be stored. (See fig. 7 for sample report.) Preparation and submission of this report may be a coordinated effort between railway service personnel and those of the field transportation office.

*Figure 7. Daily Installation Situation Report
(DA Form 1322).*

(Located in back of manual)

c. At battalion headquarters, the information below is extracted and forwarded to group headquarters. At group or command headquarters, the information is consolidated and forwarded to the transportation offices.

- (1) Station or reporting agency.
- (2) Total cars on hand for unloading at 1800 hours the previous day.
- (3) Total cars received during the past 24 hours for unloading.
- (4) Total cars unloaded during the period.
- (5) Total cars on hand for unloading at 1800 hours.
- (6) Total cars loaded during the period.
- (7) Total loaded and empty cars forwarded during the period.
- (8) Total loaded cars on hand for forwarding.
- (9) Total empty cars on hand at 1800 hours.

56. Operational Report

The operational report is made by the train dispatcher's office at a specified time, normally 0700 hours, showing the position of trains on the line. The report shows, with pertinent remarks, any special or passenger trains, or urgent movements. The report includes information relative to wrecks, washouts, bombings, guerilla attacks, and any unusual conditions which may affect normal operations. Terminals, yards, and stations furnish the information for this report.

57. Personnel Movement Reports

As specified in the standing operating procedure, personnel of terminals and yards compile reports on one carload or more of personnel moving by rail. This report shows boarding time, departing time, passings at specified stations, and estimated arrival time at destination. Information on messing and comfort stations, and delays en route are also noted.

58. Conductors' Reports

Conductors' reports are made to the chief dispatcher covering bad-order cars set off en route, and are also made of cars picked up at sidings where there are no stations. The conductors' wheel report is prepared by the operating agency under phase I operation and under phases II and III when required. The report is initialed to show where each car shown on the wheel report was picked up or set off. This report is also used as a train consist and a copy is furnished to the

field transportation officer at the point of the origin of the train. Other reports are made of train and crossing accidents, derailments, personal injuries, indications of sabotage, guerilla activities and other unusual incidents.

59. Train Operating Company Reports

The company headquarters furnishes an immediate report on train wrecks or other traffic interruptions caused by bombings, sabotage, guerilla action, or any other cause. The report includes an estimate as to when traffic will be resumed. This is followed by frequent progress reports. Special reports are made to the superintendent on any other unusual situations which are likely to affect traffic flow. Reports on routine matters and special situations are made as required by yards, stations and terminals to the chief dispatcher and trainmasters. Resumés of the current operating situation are made regularly by the trainmaster to the superintendent. Form numbers for routine reports are shown in the appendix.

60. Maintenance of Way Reports

Maintenance of way reports are prepared by the railway engineering company. These reports cover normal operations in repair and rehabilitation work and are for the information of the battalion commander and higher headquarters. Special reports must be made promptly on the extent of damage to tracks, bridges, tunnels, and buildings which result from wrecks, floods, enemy and guerilla action, sabotage or other causes. In-

juries to maintenance of way personnel must also be reported. If traffic is obstructed, an estimate will be made as to the time track work will be completed. Progress reports must be made regularly until the track is repaired and the line is open for movement. Important maintenance work, such as on bridges, tunnels, and the opening of new lines to traffic, require that battalion headquarters and higher headquarters be fully and regularly informed as to work progress.

61. Maintenance of Equipment Reports

Equipment maintenance reports by the railway equipment company include daily enginehouse reports on available motive power, on the number of locomotives undergoing repairs, and the estimated time when each will be ready for service. Reports on any new motive power being placed in service, on the fuel situation, and on car repairs are made daily. The number of cars repaired, and the number awaiting repairs, must be shown. In addition, the car numbers are shown when loaded cars are involved. Reports are also made of the extent of loss or damage to equipment in all wrecks or other occurrences in which equipment and rolling stock is involved. The company prepares any additional reports on operations, accidents, personal injuries, supply and stock levels as may be prescribed by the battalion commander.

62. Accident Reports

The chief dispatcher is charged with reporting promptly to battalion headquarters all accidents

and personal injuries occurring on the division. He furnishes such other reports as are directed by the battalion commander.

63. Special Reports

a. Special reports are made by all segments on any unusual occurrence or situation. These are often required on a particular project such as work progress on a bridge, track, or other vital facility. Where the supply situation is acute, or during critical situations, a handling or operational report may be required every 12 hours.

b. Miscellaneous information, in addition to the normal, may be required in the form of reports. At times, because of the urgency of the matter and due to communication difficulties, requests may have to be made to the station agent, yardmaster, or others directly by the office of the transportation officer. Full cooperation must be given in answering such requests and every effort made to furnish the information requested promptly and completely. A report of such information furnished direct must be given to battalion headquarters promptly.

64. Records

Officers and enlisted men in charge of terminals, yards, and stations, and other such agencies are responsible for seeing that copies or book records of all special and routine reports are retained. These are considered a part of the battalion permanent records and will be properly safeguarded until disposal instructions are re-

ceived from the battalion. The battalion will obtain disposal instructions from the railway group. Disposal will be in accordance with AR 345-905 and with theater standing operating procedures.

Section III. RAILWAY OPERATIONAL CONTROL

65. General

As operations superintendent of the railway division, the battalion commander is responsible for the overall supervision and operation of the rail division assigned to his battalion. He is assisted by his staff and company commanders who command the subordinate units of the battalion. The executive officer assists the commander and acts for him in his absence. The company commanders are responsible to the battalion commander for the rail departments assigned to them; namely, train movement control, maintenance of way, maintenance of equipment, trains operations, and, when necessary, for electric power transmission.

66. Command Functions

The battalion commander organizes his operation, designates the location for subordinate units, and delegates authority to those responsible for the various operational functions. He exercises general supervision over the entire rail division. Command inspections are made regularly to see that efficient and dependable operations are maintained. The commander works closely with higher headquarters, keeping informed on all plans which affect the battalion. These include change

in locations of railheads, advances which will cause the operation of new portions of rail lines, and emergency movement of supplies and personnel. From information secured from his staff, by his own observation, and by conferences and discussion with battalion officers and personnel, he keeps abreast of the operational situation. He must know at all times the capabilities of his operation so that he may meet special requirements and/or emergency situations.

67. Staff Functions

Close and energetic supervision is required of the staff and subordinate commanders who act under the policy and directives of the battalion commander. Supervision is accomplished by visits of staff officers and subordinate commanders (trainmasters, master mechanic, maintenance of way superintendent, and other designated operating officers) and by their study and analysis of periodical, special, operational, and situation reports. The battalion commander must have accurate information on which to base his estimates and decisions. The staff should not wait until called upon but should be aggressive in obtaining current information which is then analyzed and condensed into significant facts. Keeping the commander informed includes keeping other members of the staff and interested subordinate commanders informed. This is accomplished by frequent staff and operational meetings and by proper dissemination of information. Higher headquarters must be informed immediately of unusual happenings or emergencies.

68. Station Agents

Station agents report to the trainmaster on operational matters and follow the instructions of the chief dispatcher. Administration and supply are handled by the headquarters company. The station agent has charge of the buildings, sidings, and grounds adjacent to his station. He acts as yardmaster when no yardmaster is assigned. The agent is responsible for the preparation and forwarding of the daily situation report and all other reports as prescribed by the superintendent. He is responsible for all station records including yard checks, car record book, car loading and unloading data, seal records, train arrival and departure reports, and such other records as may be required. Separate reports must be made of delays in unloading cars. The agent sees that properly prepared waybills accompany each loaded car. He keeps the chief dispatcher informed of any changes in the units and services using rail transportation at his station. The station agent is the representative of the railroad at his station. He cooperates with units and services and keeps informed on all rail operating facilities in the vicinity, reports immediately to the superintendent on failures, breakdowns, or bottlenecks, and makes appropriate recommendations on any inadequate facilities.

69. Operating Rules

The standard code of operating rules for the railway service is published in TM 55-200. Each individual whose duties are prescribed, regulated,

or affected by these rules must be provided with a copy of the manual.

a. When operating under phase I, the operating rules published in TM 55-200 will be observed.

b. Phase II operations may require different rules. Civilian personnel may be used in other than road-train crews, or military personnel may not engage directly in train service. When utilizing both military and civilian train crews, two sets of operating rules—one for the military and another for civilian personnel—will not be used on the same division at the same time. If it is necessary to use both types of crews, competent pilots will be used on each train. When civilian personnel dispatch and operate trains with the operation supplemented by military train crews (for example, military personnel operating diesel engines with civilian crews operating steam), civilian pilots will be placed with the military crew on each engine and the operating rules of the local civilian railroad will be used.

c. When operating under phase III, the normal operating rules of the civilian railroad will be in effect. Military personnel whose duties are concerned with the movement of trains, including military personnel acting in a supervisory and/or control capacity, and those engaged in any part of operations in conjunction with civilian personnel, will familiarize themselves with the rules in effect. If there is any direct participation in train operations by military personnel in conjunction with the civilians, the provisions outlined in *b* above will apply.

70. Car Allocation and Distribution

a. Allocation. The periodic movement program, authorizes the equipment necessary to fulfill requirements. Movement not on this program must be specifically authorized through movement control channels.

b. Distribution.

- (1) A copy of the movement program is furnished to the chief dispatcher under whose direction the car distributor issues orders for the prompt movement of all available empty equipment to the loading centers to meet loading requirements. The car distributor issues these orders based upon information he has received from the situation report; current station, yard, and train reports; and reports from connecting divisions. The yardmaster and station agents spot the empties for loading at the various loading installations in accordance with the programmed and authorized nonprogrammed requirements.
- (2) The car distribution for a port or other large loading center may be facilitated by a daily operational and movement conference at which the requirements for the following 24 hours are stated in line with the movement program. The chief dispatcher keeps the operations superintendent fully informed of the empty car situation and any inability to meet loading requirements. The op-

erations superintendent obtains any necessary priority instructions through movement control channels in the event there is a shortage of empty equipment.

- (3) Railway equipment must not be appropriated or hoarded by services, units, or others without proper authority. This would upset the distribution program and result in confusion and shortage of equipment already committed for use. Unauthorized use or unnecessary holding of equipment will be reported to the field transportation officer and, through channels, to headquarters transportation railway service.

71. Demolition

a. General. Railway operating battalions, particularly those in the forward areas, are responsible for the destruction of railway facilities during retrograde operations to prevent their use by the enemy. The extent of these demolitions depends upon the time available; the nature of the movement—short or long duration; the characteristics of the rail line and facilities; and the purpose of the demolitions. The purpose may be to deny use of the rail line to the enemy's combat forces or to increase the drain on the enemy's national economy. *To prevent premature and unnecessary destruction of rail facilities, the demolition plan normally will be implemented only upon receipt of orders from the railway group.* The

railway operating battalion commander is responsible for—

- (1) Preparing demolition plans for the railway division. (Priorities will be established in the plan.)
- (2) Submitting the demolition plan to the railway group for coordination and concurrence.
- (3) Revising and keeping current the approved demolition plan.
- (4) Computing and procuring the explosives and materials needed.
- (5) Training the necessary battalion personnel in demolition techniques (FM 5-25).
- (6) Requesting technical help from the Corps of Engineers when necessary.

b. Destruction of Railway Track and Structures. The railway engineering company is charged with the destruction of track and structures when implementation of the demolition plan becomes necessary. If it is desired to deny the use of a rail line to the enemy for only a short time, damage to tunnels, larger bridges, and viaducts will suffice under most conditions. If greater destruction is required, communication and power lines and substations may be burned out by short circuiting. Track rails, frogs, and switches may be destroyed by demolition. If rails are blown, the charge should be placed near the center of the rail. Before the destruction of any railway bridges or tunnels, the battalion com-

mander will determine whether or not the combat forces have any further need for them. If the combat forces intend to use the railway bridges and tunnels for future tactical purposes, the responsibility for the destruction passes to the combat forces.

c. Destruction of Railway Equipment. The railway equipment company will be charged with the destruction of shop machinery, locomotives, and railway cars when and if the demolition plan is invoked. However, every effort will be made to evacuate as much equipment as possible. If it is expedient to prevent the enemy's use of the rail line for a short time, locomotives may be immobilized for reasonable periods by removing or damaging essential parts, such as injectors or valve motions. It is essential to remove or damage the same part in all cases; otherwise the enemy will restore some of the units by cannibalizing. If greater destruction is required, locomotives and cars may be wrecked or blown up, shops destroyed, and machine tools damaged. If such tools are electrically powered, the electrical parts may be short circuited and burned out.

CHAPTER 5

RAIL OPERATIONS

Section I. MAIN LINE OPERATION

72. Train Operation

Successful train operation is accomplished by the efficient coordination of all departments in the battalion. The efficient operation of yards and terminals plays a large part in this operation. The train crews, station and tower operators, and the train dispatcher assume the most direct role in moving trains over the line—the prime mission of the operating battalion. The usual types of trains consist of ambulance, personnel, personnel and equipment, and freight trains hauling supplies and materials. Priority for movement is usually in this order. Wreck trains, work trains, and special equipment trains are operated when needed. There are occasions when wreck and work trains may have top priority of operation for the reason that damage must often be repaired before any trains can move past a point of obstruction. In the operation of any type of train, close attention must be given to the tonnage, bridge ratings, speed restrictions, clearances, and safety precautions.

a. Once conditions permit, some trains may be

put on a regular schedule. Such trains would haul perishables, other class I supplies, and supplies and materials destined to one terminal which would be in the forwarding yard at a given time each day. Early consideration should be given to the establishing of scheduled passenger service where it will be required by the civilian economy. Surveys should be made to determine what equipment is available, and what hours of the day and night the operation of passenger trains would be the most feasible.

b. When movement priorities are necessary they are determined by higher headquarters. Such priorities are obtained from the transportation officer through proper command channels.

73. Types of Operation

Trains are usually operated in a theater of operations by methods of dispatch which include fleet, manual block, train order, timetable, or a combination of these methods.

a. *Fleet Operations.* This method of operation is used principally during the early stages of military railway operations, usually before the establishing of rail communications and the construction or repair of sidings to make possible a different type of operation. Basically, this method involves the movement in one direction of only loaded trains for a specified period (4 hours, 8 hours, 12 hours, or 24 hours), and then movement of only empty trains begins in the opposing direction for a similar period. Where communication facilities do not exist, a variation of this system

may be employed. Trains may be started in one direction without any time limitation announced. The last train will carry a train order announcing that it is the last in that particular direction. When the train arrives at its destination, the train order which the crew carries is the authority for personnel at the terminal to start trains operating in the opposite direction. One aspect of this variation is noteworthy—and important: If the last train overtakes the next-to-the-last train in trouble and unable to proceed, if it can go around it, the two train crews must exchange train orders. This assures that the train carrying the order announcing it as being last is actually the last train in the given direction. Under normal fleet operation the capacity of the forward yard may be reached before the specified time arrives. With the variation described, direction may be reversed before a yard becomes too full to conveniently operate.

b. Manual Block Operation. Block operation is generally used before the completion of a dependable communications system. To permit the movement from one block section to the next, the towerman must get permission from the train dispatcher and the towerman assigned to the next forward block section. There are two types of block operation—permissive and positive (absolute) (TM 55-200). With permissive block, more than one train may occupy the same block section. In positive or absolute block operation, a train may not be permitted to enter a section that is already occupied by another train. Positive block

operation is used on all rail sections which are subject to frequent guerilla attack, enemy action, or sabotage. Thus, a train may back up to the nearest station or to safety if the crew meets a track obstruction or if the train is attacked.

c. Train Order Operation. Train orders are used when adequate and dependable communications exist and when convenient passing sidings are available. With this method, the train dispatcher controls train movements by issuing train orders to the crew in accordance with the rules and principles contained in TM 55-200. Train orders are telephoned to station agents and tower-men who copy and deliver the orders to the train crews. The train-order system is efficient and highly flexible. The train dispatcher is able to change his plans on short notice when operating conditions change. The issuing, copying, and delivering of train orders must be in strict conformity with rules 200 through 223, TM 55-200.

d. Timetable Operation. The timetable method of operation is not used until rail conditions in a theater becomes somewhat stabilized. A timetable is the authority for the movement of regularly scheduled trains, subject to the operating rules contained in TM55-200. A timetable contains columns showing regular trains and the time that they are due to arrive and depart each station on the railroad. It also contains many supplemental rules and information on physical aspects of the division. Signals, with their aspects and indications, are often published in timetables. Extra trains, which have no schedule, are not listed. The

operation in a theater may often consist solely of extra trains. Where a timetable is employed, the method of operation is often used in conjunction with train orders and/or manual block.

74. Train Dispatching

Train dispatchers direct the movement of trains, issue train orders in a clear manner to prevent misinterpretation, and maintain a train sheet which reflects the condition of the division insofar as moving trains are concerned. Dispatchers must be familiar with the physical characteristics of their division, and should ride over it to refresh their memories. They must have information available on each of the following:

a. Ruling grades and curves, and the location of all passing sidings. Of the latter, dispatchers must know the car capacity.

b. Station and yard facilities.

c. The locations of fuel and water facilities, and sources of supply.

d. The capabilities of all motive power in terms of tonnage or cars.

e. The location of all station agents, towermen, train crew billets, maintenance of way equipment and forces, and that of all operating officials.

f. Locations where slow orders need to be posted and enforced.

g. The condition of communication facilities and signal devices.

h. Weather conditions on their and adjacent divisions.

- i. Locations of railheads, units and depots.

75. Train Symbol Numbers

a. As an aid to the control of train movements, it is necessary that a system for the ready identification of military trains be used. The reporting number assigned to extra freight trains at their origin usually changes as they travel over successive divisions. By assigning a symbol number to a train, its consist is easily identified in successive divisions.

b. Symbol numbers are generally used on trains originating at ports or main depots, in addition to scheduled train numbers or extra train numbers. In some cases, two scheduled trains of the same number, originating on different days, may be moving on the line at the same time. An extra train takes a different number on each division. The symbol number, however, never changes. For example, a train from the port of Marseille to Strasbourg, France, ordinarily moves over four railway operating divisions as follows:

<i>Symbol No.</i>	<i>Train No.</i>	<i>From</i>	<i>To</i>
A-20-4-95	Extra 1082 North or No. 68	Marseille	-- Lyon
A-20-4-95	Extra 2086 North or No. 68	Lyon	----- Dijon
A-20-4-95	Extra 3090 North or No. 68	Dijon	----- Nancy
A-20-4-95	Extra 1610 North or No. 68	Nancy	---- Strasbourg

c. The symbol numbers are assigned by the chief dispatcher of the originating railway division, and the information is furnished to the

railway group. All parties concerned receive copies of the train consist. In connection with the symbol number, the letter A indicates the point of origin. If more than one route is being used, a second letter is used to indicate the route. The first number (20) indicates the day of the month, the second number (4) indicates the month of the year, and the last number (95) shows the number of trains from the point of origin that have been forwarded that particular month.

76. Ambulance Train Operation

a. Ambulance trains are assigned to the communications zone in accordance with the medical requirements. The surgeon of the communications zone determines the number of trains required, where they are based, and the location of stabling points in forward areas. Railway operating battalions must see that only experienced train and engine crews are used on ambulance trains. The railway service is responsible for—

- (1) Proper maintenance of railway ambulance equipment.
- (2) Technical operation and movement. (A 2-hour notice is required after movement is approved.)
- (3) Providing railhead facilities.
- (4) Improvising ambulance trains when necessary.
- (5) Selection of suitable ambulance train stabling points in coordination with the surgeon of the communications zone.

- (6) Notification of the field transportation officer at origin when a train departs, and the field transportation officer at destination when the train arrives.
- (7) Notification of the receiving hospital in advance of ambulance train arrivals and information on any delays en route.

b. Medical regulating sections, usually established as part of the surgeon's office, control all evacuations. They prepare ambulance train movement schedules in coordination with the railway service and advise Army and the hospitals in the communication zone of the arrival of trains. They inform the railway service when and where trains will load and unload. Close coordination between the railway service and the medical regulating section is essential for successful movement of these trains in casualty evacuations. Ambulance train maintenance sections and maintenance crews are provided in TOE 55-500. The maintenance crew rides the trains and performs running repairs and services. If the base is some distance back from the loading point, it may be necessary to keep one or more trains in the advance area to be forwarded as needed. It is necessary to provide heat, water, lights, and air while trains are being held. Loading and unloading tracks with sufficient maneuvering space for ambulance vehicles are required for the trains.

77. Assignment of Motive Power

The assignment and distribution of motive power on the division is the responsibility of the

chief dispatcher. Road engines are assigned on the basis of the number and type of trains to be run, the physical characteristics of the road, and the availability of water, fuel, and servicing facilities. Diesel-electric power is best suited where water is scarce or of poor quality. At times it may be necessary to hold locomotives and crews in forward areas ready to move at once with trains containing needed supplies and materials.

78. Road and Switch Engines

a. Road Engines. The number of engines required depends on the tonnage to be moved, the tonnage rating of the engines, the ruling grade, and the length of the run. The total net daily tonnage divided by the net train load gives the train density of the division. The average rate of speed in a theater is estimated at 8 miles per hour. The terminal time is estimated at 8 hours per day for steam locomotives, and 3 hours per day for diesels. A safe estimate for reserve power is 30 percent. The following formula provides a basis for estimating locomotive requirements:

$$TD \times (RT + TT) \times 2 \times RF = \text{Locomotive requirements}$$

TD = Train density for the line under consideration

RT = Running time

TT = Terminal time

24 = Hours in a day

2 = Conversion factor (two directions)

RF = Reserve factor (1.30 or 30 percent additional)

b. *Switch Engines.* Switch engines assigned to terminals, ports, yards, depots, and any other installations are in addition to road power. A reasonable estimate of switch engine requirements in a theater follows. A 30 percent reserve of switch engines should be added to the division total.

<i>Location</i>	<i>Switch engines required</i>
Port terminals -----1	per 30 cars dispatched and received per day
Division terminals --1	per 100 cars passing or handled per day
Railhead terminals --1	per 100 cars dispatched and received per day

79. Supervision of Train Operations

The battalion commander is responsible for train operation within his division. The two officers directly concerned and specifically responsible for train operation are the trainmaster and the chief dispatcher.

a. The operations superintendent, in his supervision of the railway division, pays special attention to train operations. Through his staff and operating officers, he keeps in direct contact with the daily operation of trains on the division. He analyzes delays and takes corrective action to prevent their recurrence. He makes certain that train movements receive top priority from all concerned.

b. The operations superintendent also sees that terminals, yards and stations are organized for prompt and efficient handling of trains, and he

holds the trainmaster responsible for this operation. He makes certain that the master mechanic has his organization set up to provide efficient handling of locomotives, that adequate car inspection forces are maintained to avoid delays at terminals, and to help insure that there are no car failures in dispatched trains while out on the road. The superintendent must see that there are no bottlenecks in the yards or that no factors exist which could cause congestion at busy points along the line. He makes certain that the maintenance of way forces keep the track and supporting facilities in top condition, and that fuel and watering stations are adequate. The superintendent calls on higher headquarters when necessary for support to improve operating capabilities.

80. Trainmaster

a. The trainmaster organizes and controls movement of the train crews. He sees that they observe all operating and safety rules, as well as all bulletined orders. He supervises the assignment and operation of the crews and makes certain that the duty roster is set up and properly working. He is responsible for the technical training of all the crew members. He makes certain that all crews are instructed against causing delays both in yard and road service.

b. The trainmaster must be constantly alert to everything that affects train operation. He makes certain that yardmasters are having crews switch cars with the fewest cuts possible to properly classify cars. He observes the makeup of trains

to be certain that they are being put together with the fewest doubles possible. The trainmaster pays strict attention to the time engines are coming off the dock and coupling to their trains. If delays occur, he corrects them by contact with the master mechanic. By riding trains over the line, the trainmaster obtains firsthand information on operating conditions in general, and learns of locations and conditions which are causing delays. He is able to note engine performance with given tonnages. If performance is not at its peak, or if avoidable conditions are causing delays, the trainmaster is able to invoke corrective action.

c. The trainmaster coordinates with the master mechanic and rides engines with him to observe locomotive performances. When necessary, they adjust tonnage ratings when difficulty is encountered on grades and in maintaining schedules. The trainmaster coordinates with the maintenance of way superintendent relative to any track conditions which are limiting engine performance. He works closely with the chief dispatcher and makes any recommendations which will improve train performance.

81. Chief Dispatcher

a. The chief dispatcher is directly responsible for the movement of all trains. Under his direction, the train dispatchers issue the train orders. These orders are considered to be the tools of the chief and train dispatcher in efficiently operating a division. On single track, the train orders assume their utmost in importance. By judicious

use, the orders prevent delay to trains in each direction, and they are the key to achieving the highest train density possible. The dispatchers must be careful in according the priority to trains having consists which warrant it most. Train orders, which govern the superiority of trains, are treated in detail in TM 55-200.

b. In supervising train movements, the chief dispatcher confers with the maintenance of way superintendent, the trainmaster, and the master mechanic on any aspect of their respective responsibilities which can be improved to effect the movement of more tonnage over the division. The chief dispatcher reports to the proper authority any violation of rules by train crews, station and tower personnel, or others under his control or jurisdiction.

c. The authority of the chief dispatcher is broad and his responsibilities are in direct proportion. He must be certain that all personnel having a direct part in train operations are fully qualified. The chief makes certain that crews are not being held on duty for excessive periods without rest. He keeps the trainmaster informed of any condition causing or tending to cause such a condition.

82. Interruptions to Traffic

a. The regular flow of rail traffic may be temporarily interrupted by wrecks, floods, slides, washouts, weak bridges, tunnel obstructions, or enemy action. The last may include sabotage to tracks, bridges, or tunnels. Regardless of the

cause, the battalion must restore the lines in the shortest time possible. Where the damage requires major repairs, the battalion commander may request, through command channels, assistance from the Corps of Engineers and Signal Corps, and for such other additional labor as may be required. An immediate report of such an interruption must be made to the area commander, to the local provost marshal in the affected area, and to the railway group headquarters.

b. The prompt notification of higher headquarters of traffic interruptions is important to the transportation officer so that he can take it into consideration in his daily planning. Should delay threaten to be of long duration, the transportation officer may require that a truck-transfer operation be established to get freight past the point of obstruction. In this event, the battalion will be called upon to arrange for a transfer point and provide the tracks, sidings, and switches.

c. When line interruptions are frequent, wreck cranes (crewed and rationed) with tool cars should be kept at strategic points where they would be prepared for movement on short notice. Ties, rail, spikes, fastenings, and other repair materials should be stockpiled at strategic points along the line.

83. Wreck Operation

a. When a wreck occurs, the dispatcher obtains an authentic report of the extent of the damage and an estimate of the time required to restore

movements. He notifies the operations superintendent and immediately calls the wrecker with its work force. If personnel are injured and there is no medical installation in the vicinity, the dispatcher contacts the medical regulator and requests medical assistance at the scene of the wreck. The train crew must render first aid until the arrival of medical personnel. The maintenance of way superintendent and the master mechanic are notified of the wreck and each takes steps pertinent to their respective departments. Meanwhile, the operations superintendent determines availability of alternate routes. On the advice of the maintenance of way superintendent, it is determined whether a bypass (shoo fly) track is feasible. The wreck train moves to the scene of the wreck immediately and starts operations.

b. If the wreck is located near a highway, rubber-mounted cranes and bulldozers can often assist the wreck crew. The wreck crane is limited by the radius of the boom. Should the wreck involve large numbers of cars, frequently motor cranes and bulldozers can move car bodies and trucks a sufficient distance to allow more working room than can the wreck crane. In most instances the prime purpose will be to get the line open as quickly as possible, and clean up and move the wreckage later.

c. The operations superintendent, the maintenance of way superintendent, and the master mechanic reach the scene of the accident by the quickest available transportation. An immediate survey is made and plans are made to enable the

wreck crane to go to work immediately on its arrival. The medical service will care for and evacuate any personnel injured.

d. Engines and cars are rerailed if possible, and any badly damaged equipment is set aside for salvage. Freight may be set off to the side of the right of way, if it impedes wrecking operations, and reloaded after traffic movement is restored. Track forces rebuild roadbed and track closely behind the wreck forces. Communications lines are restored by the signal maintenance forces.

Section II. TERMINAL AND YARD FACILITIES AND OPERATION

84. Railway Terminals

a. In addition to the yard or system of yards for train handling, terminals consist of engine-houses, car repair tracks, and fuel and watering facilities, and may include loading and unloading tracks to serve ports, depots, and other service installations. The battalion commander must plan for and recommend the construction of additional trackage if needed to increase the capacity of terminals. This may often be necessary in theaters.

b. Adequate terminal facilities are of vital importance in railway operations. Normally more than 50 percent of the life of a railroad car is spent in yards and terminals, and a large portion of the personnel and equipment of a battalion is used in terminal operations. Efficient terminal and yard operation is vital if a battalion is to

operate to its maximum capabilities. If proper facilities do not exist, or the existing facilities are not properly exploited, the line may become congested, equipment supply frozen, and general facilities rendered useless if cars cannot be moved promptly, spotted, unloaded, and the empties promptly returned for loading.

85. Railroad Yards

The technical definition of a railroad yard is found in TM 55-200. Yards range from small 10-track layouts, to progressive-type yards having a receiving, classification, and forwarding yard of 30 to 40 tracks each. In the smaller yard the yard-master may have to use the same tracks for inbound and outbound trains, and use the shorter tracks for switching and classifying cars for various destinations. A large terminal may include a system of yards (progressive) each performing a separate function as follows:

a. Receiving Yard. The function of the receiving yard is to enable trains to enter it and thus clear the main track. The cars will then be taken to the classification yard and switched. Car inspectors may commence their work in the receiving yard.

b. Classification Yard. In this yard cars are switched and classified according to their contents and/or destination. They may then be taken to service installations for unloading or loading, to repair tracks in bad order, or to the departure yard for buildup in an outbound train going to the next forward division point.

c. Departure Yard. Cars are moved from the classification yard to the departure yard where they are built up in trains for the road. Usually the various drafts of cars are placed in departure tracks so that the train is built up where its set-offs are in station order. Cars being set off en route will always be directly behind the engine. Should all cars be for the next division point and beyond, they may not have to be switched in station order.

d. Other Yards. There are often other small yards within the area of a large terminal. Often they will be used for storage, for car loads of track material, and often they will be bad-order cars awaiting their turn to go into the shop for repairs.

e. Yard Characteristics. If a yard is to perform the work planned for it and not become a bottleneck that will adversely affect the division which it feeds, there are certain desirable characteristics which it should possess. Some of the more important ones follow and, because operating conditions will vary widely, the order of listing is not to be construed as their relative order of importance.

- (1) Running tracks should extend from one end of the yard to the other. These tracks provide an unhampered route of travel for light engines, engines with cabooses, and for crews moving short drags of cars from one part of the yard to another. Running tracks usually have a designated direction, that is, eastward

or westward, northward or southward, as the case may be. Movements against the current are usually not permitted. Where only one track is available, the yardmaster will control its use and grant a crew permission to move over it either way just as soon as it has been cleared. In a yard in a foreign theater where running tracks might not exist, it might prove beneficial to assign a couple of the yard tracks as running tracks.

- (2) A yard with the main track running completely on the outside will fare much better than a yard which is divided by the main track. This assumes the operation of frequent scheduled trains which would delay yard crews wanting to cross back and forth across the main track. If no scheduled trains operate in the area, this is not an important factor. Where the main line is busy with scheduled and extra trains, it will be advantageous to have the switch entering the main track as far away from the switching lead as possible. If the lead turns into the main 40 or 50 car lengths away from the point where switching operations take place, the lead will be blocked, and switching stopped, whenever a yard engine with 30 to 40 cars wants to cross the main. If the crossover is 150 to 200 cars away from the switching lead, switching operations will be uninterrupted.

- (3) Ideally, yard track length will be such that trains of ruling length can enter the yard without doubling a portion of their trains to another track. If a departing train can be built up on a single track, instead of on two or more tracks, it will likewise save time. Should either type of train, because of short tracks, have to double, it will tie up switching operations.
- (4) Switching leads should be long enough to handle the drafts which will ordinarily be switched by the particular locomotives assigned to the yard. Long approaches to the switching leads are also desirable so that crews may make long doubles.

86. Freight Stations

a. Designating Delivery Points. Freight moves to or from a railway station or between designated stations on the same division. The operating personnel obtain the station name from the waybill. If a service installation uses a track or location designated by a particular name within the station or terminal limits, this name must be shown on waybill after that of the consignee together with additional information to permit undelayed placement of the car by the yard forces. A list of such installations and locations should be published from time to time by battalion headquarters. Station agents and yard forces should be fully familiar with the list and use it to advantage.

b. Loading and Unloading Facilities. Loading and unloading tracks require sufficient space for trucks to back up to cars and maneuver without blocking other trucks, preferably with separate routes for entering and leaving. End ramps should be provided for handling tracked vehicles and must be constructed when not available. Side ramps are usable in emergencies, but damage to car decking results from turning heavy tracked vehicles on the car when using side ramps.

c. Segregating Explosives and Flammables. Tracks for handling ammunition and petroleum products (including empty POL containers) should, if available, be isolated one from the other. Tracks assigned to petroleum products (including empty POL containers) should be separated from the various other commodities being handled at the station because of fire hazard. Bulk petroleum products should be handled on separate tracks from other petroleum products in containers to avoid switching operations while in process of unloading. Another special requirement may be unloading tracks free of overhead wires or obstructions to permit the use of cranes in car unloading.

87. Passenger Facilities

a. Facilities for handling personnel in train loads should include one or more tracks on which the equipment can be placed well in advance of loading time. If facilities are available in the terminal, the cars should be watered, given mechanical inspection, and cleaned before spotting.

If this work must be performed on the loading track, it should be completed before loading time. In the theater of operations it may be necessary to use tank trucks or other available means for watering cars. When cars are equipped for steam heat, they should be heated during cold weather before loading time, using the station facility, heater car, or, if necessary a steam locomotive.

b. Necessary space, free of vehicular traffic, should be available adjacent to the loading track to allow personnel to assemble according to plan for loading and unloading. This should also allow space for baggage and equipment handling. Small groups of personnel can usually be handled through the station or on some convenient track. In handling personnel, close coordination and cooperation are necessary among the loading or unloading unit or service, the field transportation officer, and the battalion operating personnel. Large passenger stations or areas may have two or more suitable entraining or detraining points. Facilities may also include water for cars and engines, steam heat, car cleaning tracks, storage tracks for regular and special passenger equipment, waiting rooms and sheds, and usually office and other space.

88. Ports

a. Extremely close cooperation between the battalion and personnel operating a port is necessary to afford the proper rail service to a port. The switching of piers, quays, and all loading tracks must be carefully planned with the port

organization. The pulling of loaded cars and the spotting of empty cars must be on a coordinated schedule to avoid loss of time both to port operations and to switch engines.

b. A large percentage of the tonnage from the port is moved by rail, and the capacity of a port is dependent upon clearance of the cargo from the port area promptly. The depots, dumps, and warehouses for port clearance usually are located within a 20-mile radius of the port, and rail service must be organized to provide expeditious handling of loads and empties between the port and unloading sites. Close attention and coordination are necessary to effect expeditious handling when ammunition or other commodities are loaded in trainload lots for forward destinations.

c. Car inspection and/or repair forces may be maintained at ports. They will inspect all safety appliances and make light repairs, such as repairing or replacing door fastenings, repairing brake rigging, replacing air hose, replacing knuckles, and making minor repairs to cars damaged en route to the port. They will insure compliance with loading rules and that cars conform to tunnel and bridge clearances.

89. Using Services

The services normally use available warehouses or open space for depots and dumps. If adequate trackage is not available, construction is necessary. The battalion commander should cooperate fully in selecting these locations and be in position to recommend necessary rail facilities. Elements

to be considered include accessibility from the yard or main line, the approach over single or double track, switching facilities, and storage tracks adjacent to the installation for loads and empties. The capacity of some installations may require full-time assignment of switch engines.

90. Icing Facilities

a. Icing facilities are required in a theater of operations for the protection of perishable supplies moving in refrigerator cars. While some mechanically cooled refrigerator cars may be found in a theater of operations, the majority of the refrigerator cars will be ice cooled. Such cars have end bunkers or brine tanks that are filled through trap doors on top of the cars. Ice is obtained from ice-making plants operated by the Quartermaster Corps or from local ice plants.

b. The shipper is responsible for precooling, icing, and intransit re-icing of refrigerator cars. Should intransit re-icing become necessary at points other than regular re-icing points, railway operating battalion personnel will notify the nearest representative of the shipper as soon as possible. In such cases, railway operating battalion personnel will give all assistance possible to prevent loss of car lading.

c. Railway operating battalion personnel will coordinate with the local field transportation officer in planning the movement of refrigerated supplies. The shipper will be advised of the normal duration of the trip. If intransit re-icing is required, railway operating battalion person-

nel will recommend points at which re-icing can best be accomplished.

d. In some theaters of operations, theater directives have placed icing responsibilities on the railway service. When this occurs, the railway service may request the following assistance:

- (1) Construction or rehabilitation of icing facilities (platforms, icehouses, etc.) from the Corps of Engineers (FM 100-10).
- (2) Labor for icing cars from the Quartermaster Corps (FM 10-6).

91. Enginehouses

When no enginehouse is available, tracks adjacent to the yard will be constructed or set aside for servicing the engines. The facilities will include fuel and water, a place where the fires can be shaken down and the ash pan cleaned and dumped, and track where the engine can be inspected and receive such light or running repairs as may be necessary. The necessary mechanical equipment and tools can be set up in cars if necessary. A mobile workshop (TOE 55-500) may be used at outlying points. The enginehouse or terminal is operated by the railway equipment company under the immediate charge of an enginehouse foreman or designated assistant.

92. Repair Tracks

Car repair yards or tracks are set aside at all terminals and yards for making light or running repairs to freight and passenger equipment. Bad

order cars are cut out of trains and sent to the repair track for repairs, transfer of contents, or adjustment of the load. To avoid personal injury to men working under the cars, permission of the foreman or car inspector in charge must be secured before coupling to and switching cars on the repair track. Repair tracks (rip tracks) are operated by the railway equipment company and are under the charge of the car foreman.

93. Back Shops

The railway back shop is operated by the railway shop battalion for making heavy repairs or rebuilding locomotives and cars. It is controlled by the shop superintendent, and switching is done under his direction. The yardmaster usually furnishes switching service. Tracks are designated in the classification yard for bad order equipment and for supplies and materials en route to the shop.

94. Terminal and Yard Organization

A terminal may be under the supervision of a terminal trainmaster or a general yardmaster who reports to the trainmaster or the operations superintendent (battalion commander) as directed. He is responsible for the efficient operation of the terminal and yards. In a large terminal, he may be assisted by one or more yardmasters who are in charge of the separate yards, or an assigned portion of the terminal. He coordinates the switching operations of the entire terminal, apportions the work, and al-

locates the personnel and the switch engines within the terminal. The switching in each yard or assigned area is under the control of the assigned yardmaster. Under his supervision trains are made up and broken up, all cars switched and classified for delivery or movement according to destination, and empties distributed according to allocations. Switch engine crews work under the conductor who reports to the yardmaster. Train crews operate under the supervision of the trainmaster and, when working in terminals and yards or when within yard limits, under the direct supervision of the yardmaster. Outlying yards are under the control of the trainmaster and the immediate supervision of a yardmaster or the station agent if no yardmaster is assigned.

CHAPTER 6

REHABILITATION OF FACILITIES AND REESTABLISHMENT OF SERVICE

Section I. RECONNAISSANCE AND REHABILITATION

95. General

Before leaving the continental United States, when security restrictions permit, the transportation railway operating battalion commander, his staff, and other battalion officers secure all available information concerning the railroads of the country in which they will operate. Advance planning includes a knowledge of maps which give topography of the country through which the railroads run, rivers crossed, and location of and distance between cities or between cities and ports. Details of the railroads are studied, such as gage, types and quantity of motive power and equipment, shops, single, double, and multiple tracks, bridges, tunnels, and communications. Proposed operational plans are worked out subject to change as the situation demands.

96. Advance Party

As soon as territory has been captured or liberated and railway lines uncovered, the lines must be immediately rehabilitated and opened for

operation. The Transportation Corps is responsible for reconnaissance of existing lines to determine conditions and characteristics of track; available rolling stock; and the condition of terminals, yards, and other facilities. The transportation officer must have information immediately on the capacity of the line and when it can be opened for traffic. The battalion commander must have complete factual data in order to evaluate the damages and formulate a plan of operation. For this purpose, a technically qualified advance party from the battalion, of sufficient strength to obtain the essential information, enters the area as early as practical.

97. Air Reconnaissance

The battalion commander, or other competent person from the advance party, makes a preliminary air reconnaissance over the railroad as quickly and as far forward as possible to observe general conditions and to obtain information on which to base a detailed ground reconnaissance. From this air reconnaissance, made at low altitude, the observer determines the nature and extent of the damages and the work and class of materials required to open the line. Aircraft for the reconnaissance (preferably helicopters) are secured by request through channels to the transportation officer.

98. Reconnaissance Patrol

Plans for a ground reconnaissance will consider the distance to be covered, time required, and

essential equipment and transportation. Special instructions are based on air reconnaissance and other available data. The reconnaissance party normally consists of personnel from the railway engineering and railway equipment companies and from either or both the train operating company and battalion headquarters. Plans are coordinated through channels with the Corps of Engineers, and with units in the area, for representation on the reconnaissance team. The reconnaissance party makes a complete survey of the railroad and facilities within the defined area and renders explicit reports on the conditions found. Full use is made of any civilian railway personnel with proper security clearance in conducting the reconnaissance. They are of assistance in determining routes, installations, interchanges, and other facilities, as well as locations of materials and supplies and additional railway operational and maintenance personnel.

99. Tracks and Structures

The maintenance of way personnel inspect and determine the condition of yards; main line tracks; bridges; tunnels; water points, including sources of supply; fuel points, railway communications and signals; and buildings. Any other pertinent rail facilities are included in the inspection. Rough sketches are made of yards and important facilities, showing their location with relation to the yards or main line. Personnel will note the quantity and location of all materials and supplies that can be used in repair of tracks,

bridges, structures, and communications. Access to the rail line, and to damaged structures in particular, by other means of transportation will be investigated.

100. Equipment

Maintenance of equipment personnel inspect locomotives and cars and make an estimate of the materials and time required to put repairable locomotives into operation. Working with operating personnel, they tally the available cars, showing capacity, the operable and inoperable by types, and any other information concerning the return of cars to service. A check is made of enginehouses, back shops, and fueling, watering, and all allied facilities including turntables, power facilities, and stores and supplies. A statement of the condition of equipment and the expected capacity of available car repair installations is provided. Rough sketches of equipment installations indicate location with respect to yards and main line.

101. Operational Facilities

Operating personnel survey the terminals, yards, operating facilities, and main line conditions to determine the operational possibilities. They devote particular attention to the capacities and layouts of yards and terminals, the communications and signals for train movement control, and the adequacy of sidings, water points, and fueling facilities. They coordinate requirements with maintenance of way personnel to determine

the time required for rehabilitating the line to meet minimum operational requirements and to bring the line to maximum capacity by new construction and rehabilitation. The operating personnel assist maintenance of equipment personnel in making the car count and coordinate with them the survey of all equipment, servicing, and repair facilities.

102. Results of Reconnaissance

a. Results of the survey from each field must be evaluated and technical statistics coordinated with the overall operational condition to establish the time physical facilities will be restored, the amount of power and rolling stock available for use, and the capacity of the line.

b. The reconnaissance party must promptly dispatch current reports to headquarters as the reconnaissance progresses. Reports must not be held until the end of the trip as the information is needed currently for planning purposes and for ordering and securing materials. If no communication facilities are available, a member of the party is used as a courier.

103. Rehabilitation

Based on the reconnaissance, the requirements for rehabilitation and new construction are determined. To save time and to reduce the need for new construction, existing railroad tracks and yards must be fully utilized. The railway service performs rehabilitation within its capabilities. New construction is a responsibility of the Corps

of Engineers, which may be requested to make major repairs and perform necessary reconstruction. Requests for such work are forwarded to the transportation officer through proper command channels for coordination with the Corps of Engineers and establishment of work priority. The Signal Corps is responsible for new construction and major rehabilitation of communications. The battalion cooperates to the fullest extent with these services in the performance of this work.

104. Progressive Rehabilitation

The reconnaissance party makes an initial count by types of locomotives and cars. This list is transferred to a permanent book record. Immediately on entering the area, the railway equipment company or its advance detachment starts to rehabilitate the damaged equipment, and makes the lightest repairs first to restore the largest number of cars to service in the shortest period. As cars are repaired they are added to the permanent book record and reported to railway group headquarters equipment section. Equipment requiring heavy repairs must be reported daily to railway group headquarters and work coordinated with the railway shop battalion.

Section II. ORGANIZING OPERATION AND DETERMINING CAPACITY

105. Organizing Operation

a. When the battalion arrives in the area, the troops are moved and guided as necessary to their

initial bivouac area by members of the advance party. The officer in charge, with the battalion staff and subordinate commanders, is briefed on the results of the reconnaissance and receives recommendations on action to be taken. The battalion commander modifies original plans to meet existing conditions, outlines his estimate of the situation to the staff and subordinate commanders, and gives verbal orders to initiate the course of action. The staff draws up the necessary operational plans. The battalion commander informs the transportation officer of the estimated capabilities of the line to be opened, and the transportation officer informs him of the initial movement requirements.

b. Concurrently, other personnel are performing the administrative details required to place the battalion headquarters and organic units in full operation. These include the provision and organization of quartering, messing, unit communications, defense plan, and office space.

c. Maintenance of way, maintenance of equipment, and operations personnel are immediately assigned to the jobs at hand in their respective fields to have trackage, equipment, and required railway facilities ready for operation. Under the direction of the chief dispatcher, the train movement section sets up a dispatcher's office, insures that railway communications are adequate for the proposed train operation, and that train movement operators are organized and ready to function. Under the direction of the trainmaster, yard and switching areas are defined, yard-

masters assigned, train and switching crews organized, outlying messes set up as necessary, and all arrangements completed for operation. The battalion commander signs the superintendent's bulletin, which has been prepared by the staff, and railway operations begin.

d. The situation in the theater may preclude the sending of an advance party from the battalion into the theater for reconnaissance and planning purposes. In this event it is necessary for the battalion commander to secure all the information possible when the battalion arrives and, after air and ground reconnaissance, follow through on rehabilitation in accordance with principles outlined in the preceding paragraphs of this chapter.

106. Determining Line Capacity

a. When the line opens for traffic, motive power, rolling stock, track, and general operational conditions are tested for capacity performance. The capacity increases as operations are brought in line and continues to grow as the general situation stabilizes, the essential facilities improve, and motive power and rolling stock increase in quantity.

b. The battalion commander is required to furnish a tentative estimate of the capacity of the line while rehabilitation is still in progress. This estimate is made from a factual consideration of the essential facilities; favorable or unfavorable physical characteristics and the number, type, and capacity of locomotives and cars which will be

available when the line opens. Basic considerations affecting tonnage capacity include single, double track or multiple track; light or heavy grades; maximum degree of curvature; adequacy of terminals and yards (including loading and unloading tracks); passing tracks; water and fueling facilities; condition of roadbed, track, and bridges; and adequacy and performance of communications equipment.

c. For planning purposes, in the absence of sufficient intelligence to evaluate the operating potential, the average capacity is assumed as 10 trains per day over a single track line producing 4,000 net tons daily. Because of line conditions and facilities, or a shortage of motive power and rolling stock, the actual operating capacity may be less than 4,000 net tons per day, or under favorable circumstances, may exceed that figure. Hence the necessity for a factual consideration of the specific line to be operated and the available facilities and equipment with which to operate it, is vital. Consideration must be given to the restrictions imposed by combat conditions, such as low speeds, blackouts, dispersion, combat interruptions, and the efficiency of operating personnel.

d. When intelligence (*b* and *c* above) is available, a reasonable evaluation of the operating potential of a specified railway division can be determined by use of the formula given below. Do not include passing tracks less than 5 miles apart. Sidings selected are generally uniformly spaced throughout the division.

(1) When compilation (TD) from this for-

mula results in a fraction, use the next higher number.

Single track:

$$TD = \frac{NT+1}{2} \times \frac{24 \times S}{LD}$$

Where TD = Train density

NT = Number of passing tracks

S = Average speed

LD = Length of division

24 = Number of hours per day

2 = Constant to convert to one direction

1 = Siding at final terminal

- (2) The following table is used for average speed factor for freight trains with full tonnage:

<i>Condition of track</i>	<i>Average speed per hour</i>	<i>Percent grade</i>
Exceptionally good -----	12 miles----	1 percent or less
Good to fair -----	10 miles----	1.5 percent or less
Fair to poor -----	8 miles----	2.5 percent or less
Poor -----	6 miles----	3 percent or less

Note. (a) Where the restrictive factor occurs for less than 10 percent of division, use next higher average speed (note (c) below).

(b) Where average speed falls below 6 miles per hour because of gradient tonnage, tonnage is reduced to increase speed. (Two percent reduction in permissible gross tonnage increases speed 1 mile per hour.)

(c) Where ruling grade materially affects tonnage a train may otherwise handle over the division, consider using helper service.

e. On foreign or captured locomotives which are to be used in operation and on which little or no information is available, the gross train load is obtained by actual test as quickly as track and cars become available. Wartime locomotives found in foreign countries are usually in such rundown condition from lack of proper maintenance that power and performance are greatly reduced.

f. The net train load or payload is taken as 50 percent of the gross train load. The net tonnage that may be moved over the division daily is found by multiplying the train density by the net train load. The average number of cars per train may be obtained by dividing the gross train load by the average gross weight per car. For determining the number of road and switch engines required for the division, refer to paragraph 78.

CHAPTER 7

LOCAL CIVILIAN PERSONNEL AND OPERATIONAL PHASES

Section I. EMPLOYMENT OF LOCAL CIVILIANS

107. Civilian Personnel

Local civilians is a general term referring to inhabitants of an area who are native to the country. The sources of civilian personnel within a theater of operations include the civilian nationals and the displaced persons of allied, neutral, and enemy countries in which the Armed Forces of the United States are operating. Generally, railway civilian personnel are native to the country in which the military railway service is operating.

108. Utilization

The utilization of local civilians in the theater of operations is a command decision. Within the framework of the command policy and directives, skilled and unskilled labor is utilized to the greatest possible extent consistent with safety in the area of operations. Local labor can be used advantageously in restoring the line. Civilian railway personnel are highly preferable because of their experience and knowledge of local conditions. They can point out materials and supplies

and furnish information on the maintenance and operational aspects of the railroad. Their opinions are often particularly valuable as to points of frequent landslides, and of the height of expected high water when flood conditions threaten. Projected plans are made for the maximum use of civilian railway personnel as the situation stabilizes and as conditions permit progress into phase III operation.

109. Procurement

The Civil Affairs/Military Government Office is responsible for the procurement of local civilian personnel. Civilian personnel for the initial operation may be secured from any available source consistent with the principles and policies laid down by the theater commander in planning directives. Coordination is necessary with G2 for screening and with G4 for supply. Any general matters of priority and utilization are controlled by G4. The railway service normally employs as rapidly as possible local civilian rail personnel secured through the railway organization of the country. Other procurement sources are the labor office of the existing government or military-operated labor pools. As the situation becomes more stable, requirements are submitted through normal channels to the commander having jurisdiction.

110. Supervision and Control

a. The degree of supervision required directly depends upon the attitude and loyalty of the civil-

ian personnel and of their ability and willingness to do the job. Whether the personnel are from a liberated or an occupied country must be considered. Screening is normally a responsibility of G2 and is coordinated with the provost marshal. Any question of an employee's integrity is reported immediately to the responsible security agency.

b. Because the nature of rail operation involves the use of large numbers of specialized and skilled personnel in widely diversified jobs and locations, the responsibility for supervision and control must rest with the transportation railway operating battalion. A firm but just labor policy, consistent with the theater policy and the laws and customs of the country, is necessary in order to maintain a dependable working organization. Direct supervision of actual work is accomplished by the immediate military superior who is charged with the operating efficiency of his organization. The final step in establishment of control is supervision. Strict and efficient supervision will ferret out not only incompetency, but also disloyalty or subversion. Civilian rail employees should wear identification badges.

111. Incentives and Welfare

The degree of devastation and the economic situation in the area in which the battalion is operating will determine the incentives or welfare assistance necessary. Suburban and other local transportation facilities may be disrupted or bombed out, making it necessary to furnish trans-

portation for employees to and from work. Food conditions may require supplementation in order that employees' health and strength will be sufficient for a normal day's work. A noon meal is a definite incentive for increased attendance and production. The issue or sale of clothing (in line with theater allowances) and the provision of housing if employee homes have been destroyed, are welfare activities which definitely produce maximum labor returns. Medical care in case of accident and minor first-aid treatment should be available. It may be necessary to give examinations and immunizations to control contagious disease. This paragraph in no way constitutes authority for the issue or sale of food, clothing, or blankets to civilian personnel or for furnishing them with shelter, transportation, or medical care. Welfare assistance and incentives may be authorized overseas only by the theater commander who will prescribe the extent to which they may be furnished.

112. Customs and Language

a. Native customs, habits, and religion may affect the work. Certain religious holidays and festivals may cause absence of employees. In some countries, the system of the employee's having 24 hours on duty and 24 hours off duty prevails. During his 24 hours on duty he has a rest period of 3 or more hours. National labor laws, if operative, will usually have overtime or compensatory time regulations to overcome such difficulties, or equally effective local arrangements may be possible.

b. The language barrier will necessitate military or native interpreters. It should be noted that the ability to speak English does not necessarily make the individual a good supervisor or official. Officials and subofficials who speak English, or who will soon acquire the language, will probably be found in the railway organization. They offer the advantages of experience and supervisory ability.

Section II. OPERATIONAL PHASES

113. General

a. When the transportation railway service is making plans to enter the objective area, one of the principal considerations is the actual type (system) of operation to be employed in the theater with its consequent utilization of civilian personnel. Any utilization must conform to the command policy of the theater (par. 108).

b. The railroads, when available, form the backbone of the transportation system in the theater of operations (FM 100-10) and should be utilized to the fullest extent as soon as the lines become available. Operation then falls into one of the following categories:

- (1) Operation entirely by transportation railway service personnel.
- (2) Operation and control by transportation railway service personnel augmented by civilian personnel, who are usually former railway employees returning to

their jobs. This is merely a transitory phase.

- (3) Operation and management entirely by civilian railroad personnel, formerly employed in the operation and management of the railroad, with control and supervision exercised by the transportation railway service.

114. Progressive Transition

More operating personnel are required as the situation stabilizes, the front moves forward, the combat area enlarges, the railroad lines extend, and military operating personnel are needed in the forward area. To meet the situation, the number of civilian railway employees is increased. In rear areas they may entirely relieve military personnel in accordance with plans; however, the railway service retains control and supervision. During this period the operation normally follows a progressive transition which may be classified as phase I, II, or III, according to the military effort required. During actual operations, conditions may change the sequence of the transition.

115. Phase I

Operation entirely by military personnel is normally employed in combat areas. It has the advantages of positive obedience to orders and assurance of maximum efficiency of operations and security of military operations in forward areas. It avoids any language difficulties or other difficulties arising from native customs and as-

sure maximum operating efficiency at all times. It is usually adopted in the first phase of the operation, and/or in areas where civilian railway employees are not available, or where it is inadvisable to use them. It may be continued indefinitely in areas critical to military operation, such as ports, key terminals, or lines of limited capacity.

116. Phase II

a. Phase II operation as described in paragraph 113*b*(3) is normally the transitory stage of the operation; however, this phase may be employed immediately upon entering the area if civilian railway personnel are available. Combat conditions or the critical nature of the operation may preclude augmentation until the combat area moves forward and conditions stabilize. Augmentation under this phase presupposes organized assistance in substantial form and not merely intermittent help. It may be in any one or more of the railroad departments—maintenance of way, maintenance of equipment, or specific assignment in train and/or yard operations.

b. Phase II operation may also result from the necessity of augmenting a phase III operation with transportation railway service personnel for the purpose of increasing capacity or dependability of operations.

c. The implementation of phase II operation does not relieve the railway operating battalion of its responsibility to operate and maintain the assigned railway division. Phase II operation

has the advantages of restoring civilians to their jobs, thus aiding the local economy, and implementing the transition of rail operations from military to civilian personnel.

117. Phase III

a. Operation entirely by civilian personnel is usually attained in the progressive transition, but under favorable conditions, and when in accordance with the overall policy, such operation may be inaugurated immediately on entering the area. Phase III operation has the advantages of releasing a maximum number of transportation railway service personnel for service in forward areas, increasing the employment of civilian railway personnel, and expediting restoration of all railway service in rear areas, which boosts the local economy.

b. Under phase III operation, the transportation railway service has the responsibility in its assigned territory for supervision, staff planning, and coordination with the civilian management. It has the responsibility of maintaining field supervision in yards and terminals, enginehouses, dispatchers' offices, and the superintendent's office. The operation is entirely by civilian personnel, usually employees or former employees of the railroad, and includes the actual performance of all functions of operation, maintenance, and communications by these personnel. In a phase III operation, conditions may make it desirable to control and supervise supplies and materials, including fuels and lubricants.

CHAPTER 8

RAILWAY COMMUNICATIONS AND SIGNALS

118. General

Adequate and dependable communications are essential to train operations and the functions incident to the operation of a railway division. Roadway, motive power, rolling stock, terminals, and all other facilities may be sufficient; but unless there are ample railway communications for adequate supervision, trains will tie up, congestion will follow, and line capacity will be reduced to a minimum.

119. Railway Communications Responsibilities

a. Construction. The Signal Corps is responsible for furnishing communications and all communications supplies for railway operation. This includes construction of new wire circuits and/or the reconstruction and rehabilitation of former railway communications land lines which have sustained war damage, including those made inoperable by enemy action from sabotage or guerilla activities or those damaged in retrograde movements.

b. Maintenance. The responsibility for the

maintenance of railway communications and signals is as follows:

- (1) The railway service is responsible for the maintenance of railway communications circuits used exclusively for the operation and administration of military railways. This responsibility becomes effective when all the circuits along the military railway line have been turned over to the transportation railway service for the administration and operation of the military railways.
- (2) Where communications circuits are used jointly by the transportation railway service and other agencies (only when prescribed by higher command), the maintenance is the responsibility of the Signal Corps.

c. Operation. The railway service is responsible for the operation of railway communications for train dispatching, block and message circuits, and all other communications circuits used for railway operation and administration. Communications facilities turned over to the transportation railway service exclusively for railway operation and administration will not be available for other purposes, except under special arrangements and when specifically prescribed by proper authority.

d. Signaling Systems. The responsibility for signaling systems is given below.

- (1) The railway service is responsible for

the installation, operation, and organizational field and depot maintenance of railway block signals, interlocking plants, or centralized train control devices for military railroads.

- (2) The Corps of Engineers is responsible for the construction and rehabilitation of primary electrical power sources and transmission lines from the sources for the operation of such railway signaling systems.

e. Organizational Communications. The transportation railway operating battalion is responsible for the construction, maintenance, and operation of its organizational communications with TOE equipment.

120. Reestablishing Communications

a. The railroad must have communications for operation. The plans for reconnaissance, restoration, and operation of the railroad include the railroad communications. Reconnaissance (par. 98) determines the condition of the communication lines and facilities, the extent of any damage, and the construction and rehabilitation necessary to restore to service.

b. The railway operating battalion, in its assigned territory, is responsible for immediately initiating the request through proper command channels, for the Signal Corps to construct as conditions require (par. 119). If the area traversed by the communication lines has been mined, immediate action must be taken through

proper command channels for removal of the mines.

c. Conditions may be such that the work of reestablishing communications must be done by, or under the supervision of, the railway operating battalion with necessary augmentation by construction personnel. In this event, an estimate must be made of the materials and supplies required, requisitions prepared with full nomenclature of items, the job organized, plans made for delivery of materials before work requirements, and transportation arranged for personnel to and from the job.

121. Communications Circuits

a. The communications system for the operation of a railway division normally consists of the following circuits:

- (1) *Train dispatchers' circuit.* The train dispatchers' circuit is used solely for train movements.
- (2) *Station-to-station circuit (block phone).* A station-to-station circuit is used for train movements between stations when the railroad is being operated under the block system. It is also used by stationmasters and agencies in handling operational matters with other station agents.
- (3) *Message circuit.* The message circuit is used for car distribution, dissemination of movement instructions to operating personnel, daily and special reports, and other miscellaneous requirements. Ad-

ditional circuits may be required, depending upon the volume of traffic.

- (4) *Supervisory circuit.* The supervisory circuit is required for operational supervision by the battalion commander and staff in their daily telephone contacts with supervisory personnel in terminals, yards, enginehouses, outlying stations, maintenance of way detachments, and other installations. Heavy train movement may require additional circuits, especially in an extended phase II operation.
- (5) *Teletype circuit.* The teletype circuit is required for teletype machines used in transmitting train consists, movement programs, general instructions, messages, and miscellaneous matters requiring record.

b. When an operation progresses from phase II into phase III, care in the allocation of wire circuits is necessary. Adequate communication facilities for efficient rail operation by the civilian railway personnel must be provided. The railway service must retain circuits sufficient to exercise control and supervision and to gather reports and operational data. The construction of one or more additional circuits may be necessary at this time to properly effect the change in operation.

122. Means of Communication

a. The telephone is the principal means of communication employed by the railway operating

battalion for train dispatching in the theater of operations. Railway communications telephone equipment ranges from the simplest field installations to a complete railway train dispatching system. By means of a train dispatching selector set, the train dispatcher, in controlling the trains of his division, is able to select and call a station without ringing other stations. Telephones are installed in operations headquarters and outlying points as required, including terminal offices, stations, yards, and towers.

b. Where land lines are inoperable, the Signal Corps will, on approval of the appropriate theater commander, provide an automatic radio relay communications system until land communications can be constructed or rehabilitated. A radio repair team will be provided and attached to the railway operating battalion for supervising the installation of this radio equipment and maintaining and keeping it in repair while in use. Such allocation of equipment will be on a "when conditions warrant, class IV" basis and will be operated by personnel of the railway operating battalion.

123. Signal Devices

In the theater of operations, automatically operated signals are generally at a minimum or entirely nonexistent as a result of enemy action. This makes necessary the use of the basic signal devices, consisting of hand, flag, lamp, and manually operated semaphore signals. As the combat line moves forward and the situation stabilizes,

it may be possible to repair, restore, and improve the signaling system.

124. Signal Maintenance and Operation Rules

a. For detailed rules governing maintenance, inspection, tests, safety precautions when installing, and action to taken for train protection when defects or damage are found in signal apparatus, refer to TM 55-205.

b. For rules governing the operation of signals controlling train movements, refer to FM 55-200.

CHAPTER 9

MAINTENANCE OF ORGANIZATIONAL EQUIPMENT

125. General

a. Maintenance to equipment represents the care taken and work accomplished to keep any item of equipment in good condition or to restore it to serviceability when it is unserviceable. Thus maintenance includes inspecting, testing, servicing, and classifying equipment as to serviceability or necessity to repair, rebuild, modify, or reclaim. For complete information on maintenance, see AR 750-5.

b. Vehicles and other equipment, including the special heavy equipment used by the transportation railway operating battalion, must be in good operating condition at all times. Therefore, proper and continuous maintenance operations are necessary.

c. Each technical service is responsible for technical supervision over all phases of maintenance of equipment issued by it. Technical supervision encompasses the issue of technical maintenance doctrine, serviceability standards, manuals, and other technical data essential to effective maintenance.

126. Responsibility

Technical supervision is not to be construed as operational responsibility. The commander of a unit is responsible for the maintenance of his equipment. Organizational maintenance is the direct responsibility of the commander of the unit to which the equipment is assigned. The driver of each vehicle and the operator of each piece of equipment is charged with the care and preventive maintenance of his vehicle or piece of equipment. The battalion motor officer is charged with the coordination and supervision of the organizational maintenance of all vehicles and any other specified equipment.

127. Maintenance Categories

Army maintenance operations are classified into three categories which are based on magnitude, frequency, and degree of skill required. The specific categories are organizational maintenance, field maintenance, and depot maintenance. The five echelons of maintenance fall under the three categories, and maintenance operations performed within each category are as follows:

a. Organizational maintenance (first and second echelon), performed by the user of the equipment.

b. Field maintenance (third and fourth echelon), usually performed by field maintenance units of the supporting technical service.

c. Depot maintenance (fifth echelon), performed by technical services in fixed or semifixed installations.

128. Organizational Maintenance

a. The most important phase of the Army maintenance system is organizational maintenance (first and second echelon). Poor organizational maintenance seriously affects the entire system. Preventive maintenance is the most important and essential function of organizational maintenance.

b. Organizational maintenance is performed by vehicle drivers, equipment operators, and specially trained personnel within the using organization. First echelon maintenance is performed by the driver and operator before, during, and after operation and includes proper care, use, cleaning, operation, preservation, servicing, and daily and weekly inspection. Second echelon maintenance, performed by qualified unit personnel, includes periodic inspection, scheduled services, replacement of authorized parts and minor assemblies, and adjustments that can be made with available tools and equipment within the organization.

c. The responsible officer must see that all instructions, procedures, and organizational maintenance standards are complied with; that lubricants, tools, parts, and supplies are available at all times; that personnel are properly trained in care and maintenance; and that operational schedules for vehicles and equipment conform to maintenance schedules. The battalion commander arranges spot checks by qualified officers and enlisted personnel within the battalion and appropriate technical services to insure that proper

preventive maintenance is being performed within his battalion.

129. Field and Depot Maintenance

a. Vehicles and other equipment requiring field maintenance (third and fourth echelon) and depot maintenance (fifth echelon) must be promptly evacuated through normal supply channels to the maintenance facilities of the proper supporting technical service (Ordnance Corps, Signal Corps, Corps of Engineers, etc.) for repair or replacement. In some cases, repairs are made to special items of heavy equipment by the transportation railway shop battalion.

b. Frequent checks must be made on equipment turned in for repair or replacement to insure prompt return to the battalion. Close supervision and constant personal attention by the responsible officer are necessary to hasten the return of dead-lined vehicles and equipment.

130. Inspections

There are two types of inspections of concern in maintenance—command and technical. Systematic inspections by qualified personnel will insure that organizational maintenance is properly carried out.

a. Command inspections consist of formal or informal (sometimes referred to as "spot") inspections.

- (1) Formal inspections are usually scheduled. Vehicles and other equipment are displayed with operators standing by.

The commander is thus able to determine the condition of all material and the qualifications of the operators.

- (2) Informal or "spot" inspections are made in the field, usually without prior notice. They enable the commander to determine the condition of equipment in actual use.

b. Technical inspections include checking the maintenance and serviceability of equipment.

- (1) Technical services will make such technical inspections as they determine necessary to supervise the maintenance of equipment of their respective services. Such inspections include a complete check of the equipment and maintenance forms and records.
- (2) Qualified officer and enlisted personnel of the technical services also make technical inspections to determine the serviceability of motor vehicles and equipment.

131. Records and Reports

Only those forms, records, and reports required for organizations performing first and second echelon maintenance are described in this paragraph. A detailed description of many of these forms is carried in TM 9-2810.

a. *First Echelon.* The forms listed below will accompany each vehicle operating on the road or other power equipment during operation.

- (1) *Equipment Utilization Record (DA Form 2400).* Each driver of a vehicle

or operator of other equipment is required to carry this form which is an official authorization for driving or operating the equipment (driver's trip ticket).

- (2) *Accident Report (DA Form 285)*. This form is to be filled out as soon as possible by the responsible officer after investigation of an accident (SR 385-10-40).
- (3) *Operator's Report of Motor Vehicle Accident (Standard Form 91)*. This form is to be filled out at the scene of an accident by the driver or operator of the equipment involved.
- (4) *Accident-Identification Card (DD Form 518)*. This form is to be filled out on the spot by the driver or operator in the event of accident.
- (5) *U. S. Government Motor Vehicle Operators' Identification Card (SF 46)*. This form is issued to all qualified vehicle drivers and equipment operators (AR 700-105).
- (6) *Department of the Army lubrication orders*. The appropriate lubrication order will accompany each vehicle and/or piece of equipment at all times. Instructions contained therein are mandatory.
- (7) *Technical manuals*. Each vehicle and/or piece of equipment will carry the appropriate technical manual at all times.

b. *Second Echelon.* The forms listed below are operation and inspection forms.

- (1) *Equipment Inspection and Maintenance Work-Sheet of Engineer Equipment (DA Form 2404).* This form is prepared for each piece of engineer equipment.
- (2) *Preventive Maintenance Roster (DA Form 2403).* This form records the date on which inspections and checks are due on each piece of equipment and it schedules continuous service through the month.
- (3) *Equipment Daily or Monthly Log (DA Form 2408-1).* This is a record jacket for keeping forms.
- (4) *Maintenance Request (DA Form 2407).* This work request and job order form accompanies a vehicle or other equipment when evaluated to a higher echelon and indicates the repairs required. Department of the Army Form 811-1 is the receipt.
- (5) *Organizational Control Record for Equipment (DA Form 2401).* This form records the status of all vehicles dispatched for any particular day. The report includes all organizational vehicles.

c. *Supply Forms.* These forms are used to obtain, control, replenish, and dispose of property.

- (1) *Issue Slip (DA Form 1546).* This form is filled out in accordance with AR

711-16 for the purpose of obtaining authorized supplies and equipment.

- (2) *Turn-In Slip (DA Form 1546)*. This form, filled out in accordance with AR 711-16 is used to dispose of existing property.
- (3) *Exchange Tag (DA Form 2402)*. This tag, properly filled out in accordance with TM 38-750, is used to exchange unserviceable automotive equipment. The purpose of the tag is to eliminate the need for a property turn-in slip and a property issue slip when exchanging unserviceable automotive equipment.

d. Signal Corps Forms. These forms are used for first echelon maintenance of signal equipment.

- (1) Operator First Echelon Maintenance Check List for Signal Corps Equipment—Telephone Set (DA Form 2404).
- (2) Operator First Echelon Maintenance Check List for Signal Corps Equipment—Telephone Switchboard (DA Form 2404).
- (3) Operator First Echelon Maintenance Check List for Signal Corps Equipment—Teletypewriter (DA Form 2404).

CHAPTER 10

MAINTENANCE OF WAY

Section I. GENERAL

132. New Construction and Major Maintenance

a. The Corps of Engineers is responsible for new construction of military railways, including stockpiling of constructional material, as planned and requested by the Transportation Corps. The Transportation Corps is responsible for operation and maintenance of way and equipment of military railroads (AR 55-650).

b. Construction and maintenance of railroads in a theater of operations are functions respectively of the engineer service and the transportation service, except that major maintenance and repairs requiring the use of major items of construction equipment are the responsibility of the Corps of Engineers (FM 100-10).

c. The transportation railway operating battalion makes the necessary reconnaissance and develops information for new construction and major maintenance projects, in accordance with the overall theater plan and instructions received through normal command channels. The battalion commander, the maintenance of way superintendent and all personnel must cooperate fully with

the Corps of Engineers in all new construction and major maintenance projects on military railways. In some instances, such work is accomplished jointly by the Corps of Engineers and the transportation railway service under definite plans and arrangements.

133. Normal Maintenance

After railways are constructed and turned over to the military railway service for operations, minor railway maintenance in the communications zone and in the combat zone to the forward limit of traffic is the responsibility of the transportation railway service (FM 100-10).

a. The transportation railway system is normally divided for maintenance and operation into a number of railway divisions. Each division has assigned to it a railway operating battalion, including personnel in the railway engineering company for necessary maintenance of tracks and structures.

b. The battalion commander has the overall responsibility, insuring that the railway is properly maintained and that all maintenance work, instructions, and procedures are carried out. The maintenance of way superintendent, who reports to the battalion commander, is directly responsible for the maintenance of tracks and structures, for the proper supervision of all maintenance work and procedures, and for the necessary inspection of track and structures on the assigned railway division. Platoon and section leaders are

charged with the proper supervision of assigned maintenance operations.

134. Maintenance Standards

The railway division assigned to the battalion for operation and maintenance may consist of line newly constructed or rehabilitated by the Corps of Engineers and turned over to the battalion for operation and maintenance. It may also be line under operation by civilian personnel which has sustained little or no war damage. In either event, military traffic usually reaches line capacity promptly, necessitating maximum maintenance efforts. The maintenance standards are prescribed by the engineer section of the highest echelon of the railway service and will be the best possible. Major attention is normally required on tracks, bridges, and tunnels to prevent interruptions to train operation from maintenance failures. Arbitrary safety rules become secondary to military necessity for the mission. As the situation stabilizes and conditions permit, constant effort is made to raise the standard of maintenance, minimize accidents, insure dependable train operation, and increase line capacity.

135. Materials

a. Maintenance and emergency repair materials are stockpiled in adequate quantities at various strategic points along line of road, to be immediately available to meet emergency repair requirements caused by floods, storms, fires, enemy action, subversive destruction, or guerilla attacks.

b. Materials are promptly unloaded, inventoried, inspected, and neatly stockpiled in a clear space away from the nearest track. They are separated into small piles as space permits. Grass and inflammable objects are cleared from the ground where material is to be piled. Grass should also be cleared from around piles, and open fire lanes of at least 30 feet should be left at 60-foot intervals. Additional fire protection, such as water barrels or fire hose, if water pressure is available, should be provided. Proper record will be made of the material when received and a report furnished to the battalion supply officer.

Section II. ROADWAY, TRACK, AND STRUCTURE MAINTENANCE

136. General

This section is not intended to furnish complete technical instructions for maintenance of way, but to give only an abbreviated outline on the basic elements and some of the principal maintenance requirements. For regulations and instructions governing maintenance of roadway, track, and structures, refer to TM 5-370. Reference is also made to TM 5-627 which is applicable to maintenance at Army installations, but which gives technical information and specifications which are found adaptable to railway maintenance in the theater of operations as the situation stabilizes and the standard of maintenance improves.

137. Roadway Maintenance

Roadway maintenance is the care taken and work performed to keep that part of the right-of-

way on which the track is constructed in good condition and includes excavations, embankments, slopes, shoulders, ditches, and diversions of roads and streams. Following are some of the elements of roadway maintenance.

a. Drainage. Drainage is the most important feature of roadbed maintenance and should be designed to take care of both surface and sub-surface water. A well-drained roadbed is essential to good track maintenance. When a roadway is properly drained, maintenance work materially decreases and flood damage is reduced to a minimum. Ditches must be kept free of silt, debris, and vegetation at all times; culverts, pipes, and bridge openings kept open; and waterways and stream beds kept clean. Inspections must be made during and after heavy rains to insure that all drainage devices and waterways are adequate to carry off the water. Any inadequacies in the original drainage system should be corrected as they become evident.

b. Cuts and Fills. Maintenance of the slopes of cuts and fills normally involves stabilizing the slope surface to control drainage and minimize erosion. This is accomplished by suitable ground coverage and intercepting ditches. In the theater of operations, a practical material for the cover of the slopes is crushed stone or cinders tamped into place. In emergencies it may be necessary to use wire, brush, or straw matting held in place by stakes to stabilize the slope. Unstable slopes, resulting from seepage of underground water or undermining of the toe of the slope, require addi-

tional drainage. Correction of undermining at the toe may require retaining walls. Any indication of sliding slopes should be corrected immediately by adequate drainage and elimination of any water pockets.

c. Subgrade and Shoulders. Water running through the ballast quickly reaches the subgrade, where it runs off into the ditches if the subgrade is properly crowned. The slope of the subgrade must be maintained to the shoulder and any tendency to bulge from the ballast line to the point of the shoulder must be corrected immediately. (When it is necessary to fill bomb craters in the track, the material must be closely packed and the subgrade properly sloped in each direction from the center.)

d. Ballast. The ballast provides rapid and effective drainage and uniform support by distributing the weight of the load onto the roadbed. It also provides material with which the track can be evenly surfaced. The various types of ballast include broken stone, crushed rock, slag, gravel, coarse sand, or cinders. In a new construction in a theater of operations, available ballast is used as conditions require (TM 5-370 and 5-627).

138. Track Maintenance

In theaters, the track must be maintained in operable condition at all times, and inspections must be constant to protect against enemy damage and guerilla action as well as the usual damage occurring from the elements. The four primary considerations in track maintenance are gage, surface, alinement, and dress.

a. *Gage.* To insure that the desired gage of the track is correct at all times, it is necessary to make constant inspections with special attention to curves where the tendency to develop wide gage increases with the degree of curvature. Inspection of ties and renewal when they will not hold the gage are necessary.

b. *Surface and Alinement.* Regular inspections are required to insure that the correct surface and alinement are maintained in the track. Low joints must be detected and raised to uniform surface. If not corrected, low joints may cause equipment to roll enough to derail. Special attention should be given to surface and line of track at ends and approaches to bridges, culverts, through turn-outs, crossings, and at platforms. Sharp kinks caused by action of locomotives or heat must be detected and corrected immediately.

c. *Dress.* Tracks are kept dressed to drain surface water, which can create churning and poor surface if not properly drained. Improper drainage may cause soft spots, resulting in low joints and loose fastenings. Close inspection must be made to detect loose bolts and spikes. The degree of slope of the ballast from the center of the track depends on the type of ballast used.

d. *Switches.* Special attention must be given to the maintenance of switches to insure that they are properly oiled and in proper working condition and that the fastenings do not become loose. Regular checking of switches is protection against damaged and gapping switch points.

139. Structural Maintenance

a. In the theater of operations, those structures essential to the railway operation must be maintained in accordance with the standard of maintenance prescribed. The structures include bridges, culverts, tunnels, and fueling and watering facilities. Minimum clearances must be observed at all structures.

b. The maintenance of structures involves the technical maintenance of bridges, including track fastenings; track alinement, gage, and surface; bridge ties; bolts; bridge guard rails; and bridge members such as floor stringers, beams, tie rods, and expansion bearing. Regular inspections are necessary to insure that bridges are kept in good condition at all times. When the safety of any structure over which trains operate is questionable, it should be protected by flags according to the rules and the dispatcher notified to place a slow order in effect.

CHAPTER 11

MAINTENANCE OF RAILWAY EQUIPMENT

Section I. GENERAL

140. General

This section does not propose to present all the details of inspection, maintenance, and running repairs to locomotives and rolling stock as performed in enginehouses, on rip tracks, and in yards, but rather to point out the types of work necessary in the performance of maintenance and running repairs which are the responsibility of the transportation railway operating battalion.

141. Captured or Liberated Equipment

a. Railway equipment which the battalion takes over for operation may have sustained either serious war damage or none at all. In general, however, because of pressure and a shortage of supplies, wartime equipment found in foreign countries is usually in bad condition from extreme lack of maintenance. Use of grass and hardwood instead of waste and journal brasses was a field expedient of local civilian personnel in one theater. Such conditions greatly increase the repair and maintenance problem of the operating battalion.

b. The master mechanic (company commander,

railway equipment company) insures that all equipment taken over for operation is given a thorough inspection before being placed in service to avoid "hot boxes" and other operating defects resulting from poor lubrication and maintenance failures.

142. New Equipment

a. The task of assembling and inspecting knocked-down new equipment is ordinarily assigned to a transportation railway shop battalion. The railway operating battalion cooperates fully and assists in working out coordinated schedules for switching and for locomotive and other necessary equipment tests.

b. The situation in the theater may make it necessary for equipment to be assembled by the railway operating battalion. The site selected for the work should provide ample space for materials to be collected and classified, with adequate track layout or space where necessary tracks can be constructed. A production line arrangement for assembling the equipment may prove advantageous.

c. Thorough lubrication of all equipment is necessary to avoid lubricant deficiencies as a result of equipment's standing idle. Careful inspection must be made of equipment, especially to the journals and other moving parts of locomotives and tenders, and to all car journals to detect any damage from salt water or salt spray which may have occurred during the ocean voyage. Journals are quickly pitted from such exposure.

143. Lubrication

Personnel concerned with the maintenance of locomotives, locomotive cranes, and pile drivers are governed by Department of the Army lubrication orders and will requisition all lubricants in accordance with the nomenclature, stock numbers, and specifications. In case there are no Government standard specifications for a particular requirement, the order will be based on instructions issued by an authorized officer (TM 55-201).

Section II. MAINTENANCE OF LOCOMOTIVES, ROLLING STOCK, AND SPECIAL EQUIPMENT

144. Maintenance of Steam Locomotives

Maintenance and repair work in the Army is divided into steps based on the work that can be accomplished by the personnel with the equipment, facilities, and tools available. These steps are known as echelons of maintenance. During each echelon of maintenance, proper reports and records will be made. In the theater of operations, the inspection, maintenance, and repairs normally performed include—

a. First Echelon Maintenance. First echelon maintenance consists primarily of preventive maintenance and includes inspection of visible moving parts, lubrication, and minor adjustments. The train operating company of the operating battalion is responsible for first echelon maintenance.

b. Second Echelon Maintenance. Second echelon maintenance consists of preventive maintenance.

nance measures such as inspections; adjustments; replenishing of lubricants, fuel, water, sand, and other necessary supplies; and such minor repairs as replacing headlight bulbs, applying new brake shoes and air brake hose, and adjusting brakes. It includes application tests of air brake equipment, inspection of engine for fuel and lubricating oil leaks, inspection of running gear, boiler washing, and repairs which may be accomplished locally without the use of elaborate machine tools or heavy machinery. Second echelon maintenance in the theater of operations also includes repairs to, or removal of, parts whose condition might interfere with efficient operation of equipment. Such maintenance activity may include repairs to running gear necessitated by normal wear, repairs to lubricating and fuel systems, removal of wheels for turning, repairs to flues and tubes, and other repairs requiring only partial dismantling of the equipment. The railway equipment company of the operating battalion is responsible for second echelon maintenance and accomplishment of required records and reports.

c. Third Echelon Maintenance. Third echelon maintenance includes repairs within the capabilities of the railway equipment company and the railway workshop (mobile) necessary to restore damaged railroad equipment to operation on the railroad right-of-way for movement to a fixed installation for proper repairs. Such repairs normally are performed by a railway mobile workshop in forward areas. If the damage is not too

great, this unit may repair the equipment for service. In rear areas, fixed third echelon maintenance is performed by the railway equipment company of the operating battalion.

d. Fourth and Fifth Echelon Maintenance. Fourth and fifth echelon maintenance is normally performed by the transportation railway shop battalion. In the theater of operations, it may be both feasible and necessary that some heavy maintenance be performed by the transportation railway operating battalion.

145. Maintenance of Diesel-Electric Locomotives

a. On diesel-electric locomotives, maintenance by the railway operating battalion includes the performance of periodic inspections and running repairs to include daily (or trip), monthly, quarterly, and semiannual inspections shown in the current reports of inspections and repairs. Annual inspections are performed by the railway shop battalion. DD Forms 862, 863, and 864 are used for these reports.

b. References will also be made to technical manuals and manufacturer's manuals pertaining to the particular type of diesel-electric locomotives in operation on the assigned railway division. The railway operating battalion will not attempt the replacement of major parts on diesel-electric locomotives within the locomotive car body, such as main generators or complete engine assemblies, unless directed by proper authority. Components may be replaced.

146. Maintenance of Rolling Stock

The maintenance, running repairs, and inspection of rolling stock performed by the transportation railway operating battalion are outlined in detail in TM 55-203, as follows:

a. First Echelon Maintenance. First echelon maintenance is performed by car inspectors at the train originating point and at inspection points en route to insure safe movement of the car and its lading. It includes inspection of air brakes, brake gear, running gear, draft gear, and other parts and examination and lubrication of journal boxes on all types of equipment. On ambulance trains and cars, both before train departure and en route, ambulance train maintenance sections and crews (pars. 149 and 150) will be responsible for the following maintenance in addition to the above:

- (1) Stocking of other than medical supplies, such as fuel, water, ice for air conditioning and other uses, and electrical supplies.
- (2) Placing cars on, and removing cars from, standby precooling facilities when such facilities are available at loading or unloading points.
- (3) Operating and controlling heating, air conditioning, and car lighting equipment.
- (4) Renewing light bulbs and fuses.
- (5) Checking batteries.
- (6) Reporting all defects and failures to train commander.

b. Second Echelon Maintenance. Second echelon maintenance is performed at the originating point of the train and at inspection points en route by military car inspectors or civilian railroad personnel. It consists of running repairs necessary for the safe operation of freight equipment and the safe and comfortable operation of passenger and hospital cars. Such repairs do not require cars to be taken out of service and include maintenance such as replacing brake shoes; applying new air hose; adjusting brakes; applying journal brasses; repacking journal boxes; applying oil in journal box; and repairing draft gear, trucks, air conditioning, heating, or car lighting equipment, any of which may be requested by the conductor or train commander.

c. Third Echelon Maintenance. Third echelon maintenance is performed by maintenance personnel, either military or civilian, at the home terminals of the cars or at a prescribed location. It consists of running and emergency repairs that require the car to be taken out of service for a short time only, such as changing defective wheels, journals, side frames, couplers, draft gear, and air brake parts; repairs to truck and piping; and minor repairs to car body. In addition, on passenger equipment and hospital cars, it consists of daily, weekly, monthly, semiannual, and annual inspections; cleaning of equipment; changing filters, and deodorizing and cleaning evaporators. It also includes inspection; lubrication; repairs to air conditioning, heating equipment, and car lighting equipment; charging of batteries; main-

tenance of water systems and coolers; and repair and replacement of hardware and linens.

147. Organization for Maintenance

a. Repair track installations (rip tracks) are normally set up for operation at the main terminals. They are usually necessary at other points on the division, such as junction points or heavy loading centers, to take care of repairs which cannot be made at the loading installation and to avoid moving the cars into the main terminal. The master mechanic is responsible for the operation of these installations with railway equipment company personnel.

b. Care should be exercised by the railway operations superintendent and the master mechanic to insure that maintenance of rolling stock is so organized as to avoid removing cars from service for repairs when such repairs can be performed at ports, at service installations while cars are spotted, or in classification yards. In this manner repairs can be accomplished without the delay of sending cars to assigned repair tracks. Repairs which can be accomplished at outlying points include repairing doors and fastenings; replacing brake beams and components; inspection of boxes and adjustment or replacement of brasses, wedges, and packing; and minor repairs to car decking and siding and various other light repairs.

148. Maintenance of Special Equipment

The maintenance of special equipment includes maintenance and repair work on wreck train

equipment, wreck cranes, and other cranes of the battalion; heavy roadway equipment; tools and enginehouse machinery; and other special equipment utilized by the battalion in the theater.

Section III. MAINTENANCE OF AMBULANCE TRAINS

149. Ambulance Train Maintenance Section

a. The ambulance train maintenance section is designed and organized to maintain four ambulance trains that are operated out of the port, terminal, or stabling point to which the section is assigned. It is composed of officers and enlisted men as specified in TOE 55-500, whose titles indicate their duties. The section is organized for 24-hour service. It is responsible for first echelon maintenance and light repairs to ambulance trains including—

- (1) Running repairs to rolling stock.
- (2) Repair and maintenance of electrical equipment, including train and car power units, electric wiring, and batteries.
- (3) Repair and maintenance of heating and cooling systems.
- (4) Repair and maintenance of plumbing facilities.
- (5) Cleaning of the exterior of ambulance trains.

b. The section leader is the railway car foreman. He is responsible for the discipline, care, messing, housing, and supervision of his men.

Maintenance and repair functions of the section, including the supply of maintenance and repair parts, are also his responsibility.

c. The two senior car repairmen are in charge of their respective shifts and are charged with work on ambulance trains, both interior and exterior, including electrical apparatus; heating, cooling, and plumbing facilities; and cleaning the exterior. They are assisted by electricians, car repairmen, pipefitters, an air brake repairman, a railway metal worker, a painter, and a clerk, who are assigned to shifts as needed. The senior car repairmen also prepare requests for materials and supplies. The Army Medical Service is responsible for the cleaning and sanitation of the interior of ambulance trains.

150. Ambulance Train Maintenance Crew

a. An ambulance train maintenance crew is designed and organized to ride an ambulance train. It is charged with the responsibility of performing running repairs and maintenance on the rolling stock and for maintaining and operating the train power unit, other electrical equipment, and the heating, cooling, water, lighting, and plumbing facilities. Crew personnel are messed and housed with Army Medical Service personnel while on the ambulance train. They are attached to the ambulance train maintenance section for administration and duty.

b. The crew is composed of one electrician, one car repairman, and one pipefitter, as specified in TOE 55-500. The electrician maintains the wir-

ing and electrical system, including the train and car power units and other electrical apparatus, with particular attention to insuring that the batteries are kept fully charged at all times. The pipefitter is responsible for the utility car, the heating and cooling system throughout the train, and the plumbing system. The car repairman performs general repairs, handles minor defects, such as broken train equipment, and assists the other two maintenance men as required.

CHAPTER 12

TRANSPORTATION RAILWAY OPERATING BATTALION (TYPE B)

Section I. GENERAL

151. Assignment

The railway operating battalion (type B) is normally assigned to a railway group although it may be assigned directly to a railway command headquarters in a theater of operations.

152. Capabilities

When the type B operating battalion is manned by the required number of capable and industrious local civilian railway employees, its capabilities are substantially the same as those of a railway operating battalion operated by military personnel.

153. Organization

a. The type B unit is organized with the minimum number of military personnel necessary for maintaining efficient command and supervision of the civilian railway and civilian railway employees. The unit includes sufficient United States technical and maintenance personnel to insure the performance of the unit's stated mission.

b. The type B unit is not organized under a rigid table of organization; modification is authorized to meet local and changing conditions. The equipment sufficient for normal requirements is provided. When local civilian equipment is available, a full complement of TOE equipment will not be required.

c. The number of military personnel required by this type of unit may be modified by major oversea or continental United States commanders to meet the local operating conditions where the unit is to be assigned.

d. The organic units consist of headquarters and headquarters company, railway engineering company, railway equipment company, and train operating company. The electric power transmission company is attached when it is required to operate electrified railways. The personnel authorizations for type B units are indicated in a separate column in the appropriate TOE.

e. The number of jobs which must be filled by civilian personnel can be determined by comparing the appropriate type B column with the full and/or reduced strength column in the particular TOE. The number required to perform these jobs depends upon the efficiency of the personnel, the number of shifts worked, and other local conditions. The major oversea commander or the continental United States commander determines the number required.

154. Management

In a rail operation, proper control and supervision include policing the work methods and sys-

tems used by the employees who quite often do not understand the United States system. A method for conveying orders and instructions should be devised, and battalion policy and objectives should be clearly explained. With non-United States personnel, detailed standing operating procedure must be established and maintained.

Section II. BATTALION UNITS

155. Headquarters and Headquarters Company

The headquarters and headquarters company includes—

a. The battalion headquarters organization is the same as that described in paragraphs 12 and 13, except that no chaplain is provided.

b. Company headquarters has the normal company responsibilities (par. 14) and consists of the company commander, first sergeant, mess steward, supply sergeant, and seven other enlisted personnel as shown in TOE 55-226.

c. The train movement section has the same duties and responsibilities as in the full-strength battalion. The section consists of 2 senior train dispatchers, 6 train dispatchers, 2 car distributors, and 54 additional enlisted personnel for station and tower operation.

d. The administrative section operates in a similar manner and with the same duties and responsibilities as outlined in paragraph 16. The section is composed of a sergeant major and seven enlisted personnel.

e. The supply section performs the same func-

tions as shown in paragraph 17. It is composed of the battalion supply sergeant and three other enlisted men.

156. Railway Engineering Company

a. Company Headquarters. Paragraph 22 lists the duties and responsibilities of the company headquarters, which parallel those of the same unit in the type B battalion. The headquarters is composed of the company commander (a maintenance of way superintendent), the assistant, and 15 enlisted personnel. The last includes the first sergeant, section foreman, mess steward, and supply sergeant.

b. Track Maintenance Platoon. There are two track maintenance platoons and their function is described in paragraph 23. In the type B unit each platoon headquarters consists of a track supervisor (the platoon leader) and four enlisted personnel. There are three track maintenance sections per platoon, each including one section gang foreman and one assistant gang foreman.

c. Bridge and Building Maintenance Platoon. This platoon consists of a headquarters composed of a bridge and building supervisor, and enlisted personnel including the platoon sergeant and eight others. There are two bridge and building maintenance sections, each composed of a construction foreman and seven other enlisted personnel. Their duties and responsibilities have been explained in paragraph 24.

d. Communications and Railway Signal Maintenance Platoon. This platoon consists of platoon headquarters, a signal maintenance section, and

a communications unit. Personnel include a signal maintenance supervisor (platoon leader), nine enlisted personnel in the signal section, and five in the communications section. Their duties are the same as has been shown in the full-strength battalion.

157. Railway Equipment Company

The railway equipment company includes a company headquarters, a car repair platoon, and a locomotive repair platoon. Details of the organization of the company are shown in TOE 55-228.

a. Company Headquarters. The headquarters is headed by a company commander (master mechanic) who has an assistant of similar technical qualifications. There are nine enlisted personnel, and the duties and responsibilities of all have been detailed in paragraph 30.

b. Car Repair Platoon. The platoon headquarters is composed of the car foreman and seven enlisted personnel consisting of the car shop foreman and six car inspectors. The wreck crew consists of the senior car repairman, car repairmen and helpers, crane operator and a welder. The car repair section consists of the car foreman, repairmen, welder, and other car mechanics. The duties of the personnel of the platoon have been described in paragraph 31.

c. Locomotive Repair Platoon. There are three types of locomotive repair platoons:

- (1) *Steam locomotive repair platoon.* The steam locomotive repair platoon is composed of the enginehouse foreman, the

platoon leader, and 15 enlisted personnel. Their duties and responsibilities are spelled out in paragraph 32.

- (2) *Diesel-electric locomotive repair platoon.* The diesel-electric repair platoon is composed of the diesel locomotive shop superintendent, and 38 enlisted men including the shop foreman.
- (3) *Steam and diesel-electric locomotive repair platoon.* This platoon, which repairs both types of motive power, is composed of an enginehouse foreman; a diesel locomotive shop superintendent; and 29 enlisted men.

158. Train Operating Company

The company headquarters and two train operating platoons compose the train operating company.

a. Company Headquarters. The company headquarters is staffed by the company commander, a trainmaster, and four yardmasters. The enlisted personnel include the first sergeant and 22 enlisted men as shown in TOE 55-229.

b. Train Operating Platoon. There are two train operating platoons in the company. Each platoon headquarters has an assistant trainmaster and six enlisted men. Each platoon has 25 train crews. In the type B battalion each crew is composed of a conductor, an engineman and a brakeman. Their duties are outlined in paragraph 38b.

PART THREE

TRANSPORTATION RAILWAY SHOP BATTALION

CHAPTER 13

INTRODUCTION

159. General

This part of the manual is to guide the transportation railway shop battalion commander, his staff, and his subordinate leaders. It also serves as a guide for command and staff officers charged with the employment of railway shop battalions.

160. Scope of Coverage

a. The provisions published herein are general. Actual conditions under which the battalion is employed vary materially; the battalion commander will make necessary changes for the efficient employment of the battalion.

b. This part describes the organization, functions, employment, and responsibilities of the railway shop battalion and its organic units. Shop operation, supply procedure, military and technical training, and battalion defense measures are included.

c. All tables of organization and equipment references give only the basic number. The reference will apply to both the table with the basic number and the table with a suffix.

CHAPTER 14

ORGANIZATION

161. Mission

The mission of the transportation railway shop battalion is to perform depot and field maintenance on the steam and/or diesel-electric locomotives, rolling stock, and special railway equipment of a military railway.

162. Assignment

One or two railway shop battalions are normally assigned to a transportation railway group. In the absence of a group headquarters, they will be assigned to the next higher railway service headquarters. Each shop battalion can perform field and depot maintenance in support of two to four railway operating battalions.

163. Capabilities

a. The transportation railway shop battalion is capable of performing maintenance support for 100 steam locomotives, 200 diesel-electric locomotives (units), and 2,500 railway cars.

b. The railway shop battalion can also perform field and depot maintenance on 10 steam loco-

tives, 25 diesel-electric locomotives (units), and 600 railway cars per month.

c. For operations in which only steam power is utilized, this battalion may be activated without the diesel-electric locomotive repair company (TOE 55-247). When so activated, its capabilities are as follows:

- (1) Performing depot maintenance on 100 steam locomotives and 2,500 railway cars.
- (2) Performing maintenance on 12 steam locomotives and 600 railway cars per month.

d. The capabilities of the battalion can be increased by adding maintenance teams from TOE 55-500 or by employing local civilian railway shop personnel.

164. Organization

a. The railway shop battalion is organized to form a balanced unit for repair of railway locomotives, cars, and equipment. Each battalion includes the personnel to operate a shop for the dismantling, repair, and erection of railway locomotives, cars, and work equipment. It is the basic unit for railway shop operations and may be expanded for the operation of shops beyond the capacity of the original organization. Figure 8 shows the organizational chart. The type of railway equipment in use and the actual operations performed by the battalion may require modifications of the organizations shown.

b. For purposes of organization, administra-

tion, and control, battalion personnel are grouped in the following five organic companies:

- (1) Headquarters and headquarters company (TOE 55-236).
- (2) Erecting and machine shop company (TOE 55-237).
- (3) Boiler and smith shop company (TOE 55-238).
- (4) Car repair company (TOE 55-239).
- (5) Diesel-electric locomotive repair company (TOE 55-247).

c. Organic motor vehicles are limited to those required for unit administration, liaison, and supply. The battalion moves by rail, and transportation must be provided by higher headquarters.

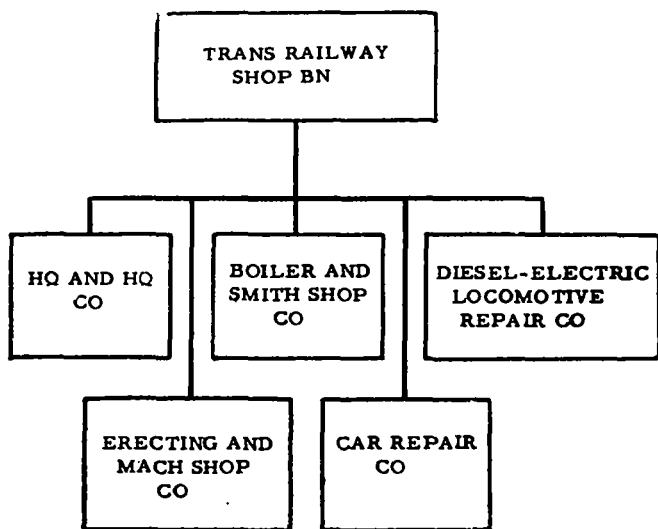


Figure 8. Organization—railway shop battalion.

165. Command and Staff Responsibilities and Relationships

a. The battalion commander normally reports to the commanding officer of the railway group. However, in the absence of a railway group, he will report direct to the next higher transportation military railway service echelon in the theater.

b. Staff officers of the transportation railway group (TOE 55-202) and the transportation railway command (TOE 55-302) exercise technical supervision over technical operation of the battalion. Direct contract is authorized between the staff officers and the battalion on technical matters.

166. Terminology

The duty relationship between positions and military titles in the railway shop battalion is as follows (for MOS refer to TOE):

BATTALION HEADQUARTERS

<i>Military occupational specialty title</i>	<i>Military title</i>
Railway shop superintendent	Battalion commander
Assistant railway shop superintendent	Battalion executive officer
Railway supply officer	Battalion supply officer (S4)
Assistant railway superintendent	Assistant battalion supply officer (assistant S4)

ERECTING AND MACHINE SHOP COMPANY

Military occupational specialty title

Military title

Erecting and machine shop superintendent ----- Company commander
Railway machine shop superintendent ----- Platoon leader
Air brake superintendent ----- Section leader
Erecting shop superintendent ----- Platoon leader

BOILER AND SMITH SHOP COMPANY

Military occupational specialty title

Military title

Boiler and smith shop superintendent ----- Company commander
Boiler shop superintendent ----- Platoon leader
Smith shop superintendent ----- Platoon leader
Pipe and tin shop superintendent ----- Platoon leader

CAR REPAIR COMPANY

Military occupational specialty title

Military title

Car shop superintendent ----- Company commander
Car shop superintendent (stripping and erecting) ----- Platoon leader
Car shop superintendent (fabricating and woodworking) ----- Platoon leader
Car shop superintendent (finishing) ----- Platoon leader

DIESEL-ELECTRIC LOCOMOTIVE REPAIR COMPANY

Military occupational specialty title

Military title

Diesel locomotive shop superintendent ----- Company commander
Diesel locomotive shop superintendent (diesel engine) ----- Platoon leader
Diesel locomotive shop superintendent (diesel-electrical) ----- Platoon leader

CHAPTER 15

BATTALION UNITS

Section I. HEADQUARTERS AND HEADQUARTERS COMPANY

167. Mission

The mission of headquarters and headquarters company (TOE 55-236) is to provide command technical supervision and plant maintenance for the transportation railway shop battalion.

168. Functions

The functions of headquarters and headquarters company are—

- a.* Planning, supervision, coordination of operations, administration, mess, and supply of companies organic to the battalion.
- b.* Rehabilitation, repair, and maintenance of all necessary plant structures, facilities, tools, and machinery for all companies of the battalion.
- c.* Operation of battalion power plant facilities.

169. Organization

Headquarters and headquarters company is organized in accordance with TOE 55-236. The components of the company are as follows:

- a.* Battalion headquarters.

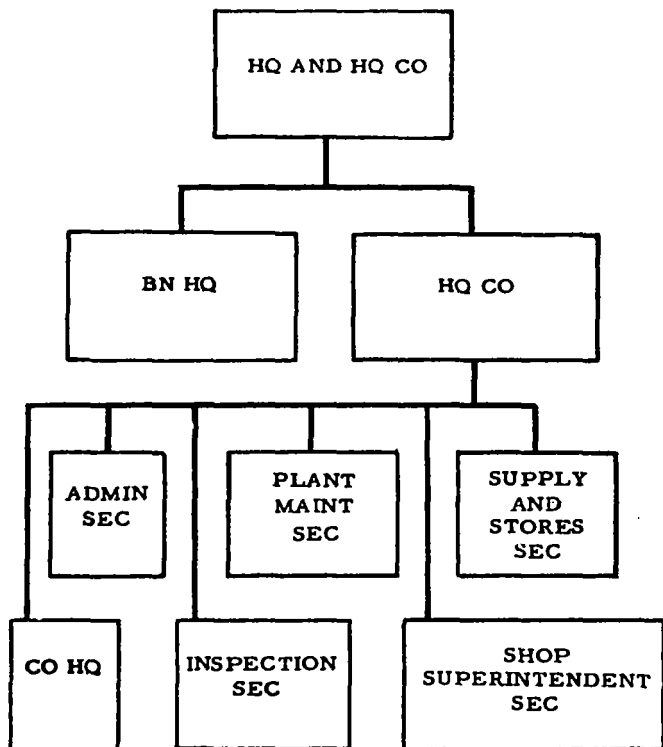


Figure 9. Organization—headquarters and headquarters company.

b. Headquarters company.

- (1) Company headquarters.
- (2) Administrative section.
- (3) Inspection section.
- (4) Plant maintenance section.
- (5) Shop superintendent section.
- (6) Supply and stores section.

170. Command and Staff Responsibilities

a. Battalion Headquarters. Battalion headquarters directs all activities of the unit. The battalion commander and his staff supervise the activities of the battalion's organic and attached units with the railway group and are responsible to the group commander for the operation of these units.

- (1) The battalion commander, as superintendent of the shops and facilities assigned to his battalion, is responsible for—
 - (a) Training, discipline, messing, housing, and morale of his troops.
 - (b) Necessary reports and records for efficient operation of shops, facilities, and personnel, and reports which are required by higher authority.
 - (c) Technical operations of the battalion, including management and coordination of all units and efficient use of personnel and equipment.
 - (d) Determination of methods for assembly and repair of railway equipment and arrangements for procurement of additional personnel if required.
 - (e) Familiarity with operating conditions of the railway group to which his battalion is assigned.
 - (f) Recommendations for systematic repair of equipment.
 - (g) Exercising control through his company commanders.

- (h) Necessary arrangements for medical service to personnel of his battalion and attached units.
- (2) The battalion executive officer is assistant shop superintendent and is second in command. He makes decisions supplementary to the basic decisions of the battalion commander and directs the work of the shop superintendent section. He also serves as technical plans and training officer.
- (3) The battalion adjutant is in direct charge of the administrative section of the battalion. He is responsible for the military administration of the battalion and handles matters relating to personnel, battalion orders, records, guard, mail, and messenger service. He advises the battalion commander on all matters relating to military training and military employment of the battalion. He is assisted by a personnel warrant officer.
- (4) The battalion supply officer is responsible for the procurement, storage, and issue of food, clothing, ammunition, equipment, and railway supplies for the battalion, as well as for salvage and reclamation. He checks requests submitted by the companies, consolidates the requests when feasible, and prepares requisitions.
- (5) The battalion chaplain advises the commander on moral and religious matters.

He plans and conducts religious services, performs religious rites, ministers to the sick and wounded, and in general is concerned with the spiritual welfare of battalion personnel. He coordinates and conducts training in character guidance for the battalion.

b. Headquarters Company. Headquarters company functions are as follows:

- (1) *Company headquarters.* The company commander commands headquarters company, assisted by a first sergeant. Other personnel assigned for normal company administration, supply tasks, and specialized tasks include the mess steward, cooks, supply sergeant, company clerk, armorer, drivers, engineer equipment maintenance supervisors, and wheeled vehicle mechanic. Company headquarters is responsible for the following:
 - (a) Administration for all personnel assigned to headquarters company.
 - (b) Provision for billeting for the battalion.
 - (c) Performance of organizational maintenance on all battalion vehicles and supervision of organizational maintenance on all battalion engineer equipment.
 - (d) Operation of the battalion motor vehicle pool.

- (e) Operation of the battalion mess.
- (2) *Administrative section.* The administrative section functions under the control of the battalion adjutant assisted by a personnel warrant officer. Personnel assigned to this section include the sergeant major, personnel sergeant, personnel administrative supervisor, personnel management specialist, chaplain's assistant, clerk typists, mail delivery clerk, personnel administrative clerk, troop information-education specialist, general clerk, and switchboard operator. The functional responsibilities of this section are—
- (a) Preparing morning reports for the company and consolidating morning reports of all companies of the battalion for transmittal to higher headquarters.
 - (b) Preparing for the signature of the battalion commander all official correspondence emanating from the battalion.
 - (c) Preparing and processing special orders as authorized by the battalion commander.
 - (d) Advising the commander on personnel and administrative matters appropriate to the section.
 - (e) Assisting subordinate units in administrative and personnel matters.

- (f) Operating a battalion personnel section consisting of a personnel administrative clerk from each company in the battalion.
 - (g) Operating an intrabattalion communications and message center.
 - (h) Coordinating with higher headquarters on personnel and administrative procedure.
 - (i) Providing clerical and technical assistance to the information and education officer and chaplain.
- (3) *Inspection section.* The inspection section functions under the control of the battalion executive officer. Personnel assigned to the section include a railway car inspector, a boiler inspector, a diesel-electric locomotive inspector, and a steam locomotive inspector. The functions of the section are as follows:
- (a) Inspecting all locomotives, cars, subassemblies, and parts that come to the shop for repair to determine the work necessary, and scheduling such work to the companies.
 - (b) Inspecting and testing all locomotives, cars, subassemblies, and parts after completion of repair work.
 - (c) Reporting to the battalion commander all repairs that are necessary because of neglect on the part of operating personnel.

- (d) Coordinating the shop schedules and maintaining a routine system of repair work to the shops.
 - (e) Reporting to the battalion commander on flow of work, work orders, and material estimates.
- (4) *Plant maintenance section.* The plant maintenance section functions under the control of the railway shop maintenance engineer. The enlisted personnel are divided into two groups according to functions. The machinery maintenance group is under the supervision of the electric power equipment foreman and consists of electric motor repairmen, power generator repairmen, and helpers. The building maintenance group consists of shop maintenance repairmen, electricians, plumbers, and helpers. The functions of this section are—
- (a) Maintenance and repair of power house boilers, machinery, pumps, air compressors, and generators.
 - (b) Maintenance and repair of all buildings and building facilities.
 - (c) Operation of pumps, air compressors, and generators.
 - (d) Preparation of rules and regulations for operation of machinery and for safety and fire protection.
 - (e) Handling of shop fuel and lubricants.
- (5) *Shop superintendent section.* The shop superintendent section is headed by a

chief administrative clerk. Other personnel include draftsmen and clerks. The functions of the section are—

- (a) Supervising preparation of reports on shop operations and records and data for technical operation of the battalion.
 - (b) Preparing all work involving mechanical design and drafting for the battalion.
- (6) *Supply and stores section.* The supply and stores section operates under the direct control of the battalion (railway) supply officer. The assistant railway supply officer is in charge of the section. He is assisted by a warrant officer, supply. Enlisted personnel include a transportation supply sergeant and assistant, a crane operator, transportation storage specialists, a transportation parts specialist, a transportation supply specialist, stock record clerks, and supply clerks. The functions of the section are—
- (a) Receiving requests for military and technical supplies from component companies, consolidating the requests, and preparing requisitions.
 - (b) Procuring, storing, and issuing to component companies raw materials, manufactured assemblies, finished and semifinished materials, tools, and equipment necessary for operation of

the shop and, as required, for the transportation railway operating battalions.

- (c) Establishing priorities for issue of supplies.
- (d) Inspecting component company supply procedures and records.
- (e) Supervising supply economy.
- (f) Reclaiming and rehabilitating materials turned in.
- (g) Receiving, storing, and distributing military supplies for the battalion.

Section II. ERECTING AND MACHINE SHOP COMPANY

171. Mission

The mission of the erecting and machine shop company (TOE 55-237) is to perform depot maintenance involving erecting and machine shop work on steam and diesel-electric locomotives in support of the mission of the railway shop battalion.

172. Capabilities

a. Capabilities. Company capabilities are—

- (1) Dismantling and assembling steam locomotives received by the battalion for repair.
- (2) Testing new steam locomotives received by the battalion.
- (3) Performing machine operations on manufactured parts for the battalion.
- (4) Maintaining and repairing locomotive air brake equipment.

- (5) Fabricating tools and dies for other military railway units.

b. Limitations. This company is dependent upon headquarters company for billeting and mess and for supervision of organizational maintenance of plant facilities and motor vehicles.

173. Organization

The erecting and machine shop company (fig. 10) is organized in accordance with TOE 55-237. The components of the company are as follows:

- a. Company headquarters.*
- b. Machine shop platoon.*
 - (1) Platoon headquarters.
 - (2) Machine shop section.
 - (3) Toolroom section.
 - (4) Air brake section.
- c. Erecting shop platoon.*
 - (1) Platoon headquarters.
 - (2) Stripping section.
 - (3) Erecting section.

174. Functions

a. Company Headquarters. The company commander (erecting and machine shop superintendent) is assisted by the steam locomotive repair control sergeant in the performance of technical railway shop duties. Other personnel assigned to company headquarters include a first sergeant, supply sergeant, engineer equipment mechanics,

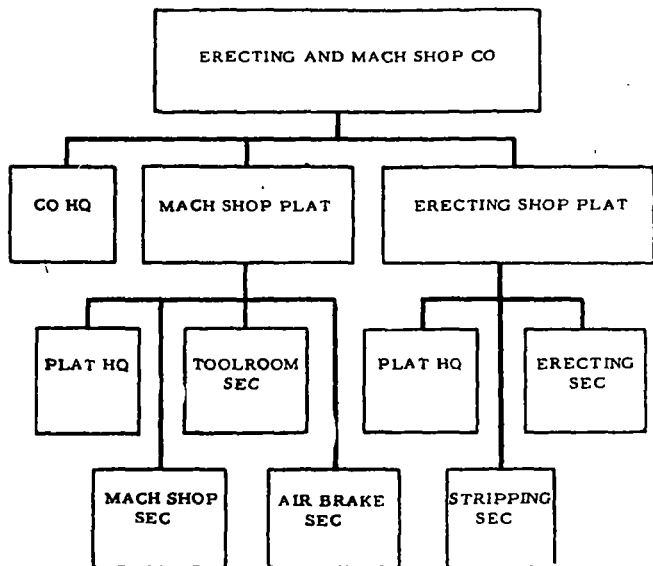


Figure 10. Organization—erecting and machine shop company.

transportation supply specialist, and clerks. The functions of company headquarters are—

- (1) Administration for all personnel assigned to the company.
- (2) Receipt and issue of technical materials and equipment.
- (3) Preparation of routine reports and organizational records.
- (4) Receipt, care, and issue of military supplies.
- (5) Performance of organizational maintenance on all engineer equipment in the company.

b. Erecting Shop Platoon. Erecting shop platoon functions include—

- (1) *Platoon headquarters.* The platoon commander (erecting shop superintendent) is in charge of, and coordinates the work in, the stripping and erecting sections. He is assisted by an enlisted erecting shop foreman. Other personnel assigned to platoon headquarters include crane operators and locomotive firemen used as hostlers.
- (2) *Stripping section.* Personnel assigned to the stripping section include steam boiler inspectors, a locomotive section foreman, locomotive metal workers, steam locomotive repairmen, boiler repairmen, and helpers. The functions of this section are as follows:
 - (a) Dismantling or stripping steam locomotives received for repair.
 - (b) Removing, cleaning, and inspecting steam locomotive parts scheduled for repair or replacement.
 - (c) Delivering bad order parts to the shop section or company responsible for the repair.
- (3) *Erecting section.* The enlisted steam locomotive repair foreman, who is in charge of this section, and his assistant foreman are responsible for the proper assembly and testing of locomotives. Other enlisted personnel assigned to the

erecting section include steam locomotive repairmen, welders, locomotive metal workers, diesel-electric locomotive electricians, locomotive oilers, and helpers. The functions of the section are as follows:

- (a) Repairing or assembling and testing locomotives using parts or subassemblies received from stock, the machine shop platoon, or the boiler and smith shop company.
- (b) Performing necessary panelboard repairs to diesel-electric locomotives in cooperation with the diesel-electric locomotive repair company.

c. *Machine Shop Platoon.* The machine shop platoon functions are as follows:

- (1) *Platoon headquarters.* The platoon commander (machine shop superintendent) is in charge of the machine shop, tool-room, and air brake sections. He is assisted by an air brake superintendent.
- (2) *Machine shop section.* The machine shop section functions under the supervision of the enlisted machine shop foreman. Other enlisted personnel assigned to the section include an assistant machine shop foreman, master machinists, machinists, metal machine operators, welders, and helpers. The functions of this section are as follows:
 - (a) Performing all battalion machine operations.

- (b) Dismantling, repairing, and assembling steam locomotive subassemblies, except air brake equipment.
 - (c) Machining parts for repairs to locomotives and other equipment.
 - (d) Performing necessary welding operations.
- (3) *Toolroom section.* The toolroom section functions under the direct supervision of the machine shop superintendent. Personnel assigned to this section include toolmakers and toolroom keepers. The functions of this section are as follows:
- (a) Designing and fabricating tools and dies for the battalion.
 - (b) Maintaining and supplying machine shop and toolmaker's tools.
- (4) *Air brake section.* The air brake section functions under the control of the enlisted air brake shop foreman. Other enlisted personnel assigned to the section include air brake repairmen and helpers. The functions of this section are as follows:
- (a) Dismantling, cleaning, and repairing air pump, reservoir, and air brake systems on (or for) steam locomotives and tenders and diesel-electric locomotives.
 - (b) Installing and testing air pump, reservoir, and air brake systems on steam locomotives and tenders.

Section III. BOILER AND SMITH SHOP COMPANY

175. Mission

The mission of the boiler and smith shop company (TOE 55-238) is to perform depot maintenance involving boiler and smith shopwork on steam and diesel-electric locomotives in support of the mission of the railway shop battalion.

176. Capabilities

a. Capabilities. Company capabilities include—

- (1) Performing repair and manufacturing operations on boilers and tanks received by the battalion, including pipefitting, sheet metalwork, brazing, and babbitting.
- (2) Performing structural steelwork on locomotives and rolling stock.
- (3) Performing coppersmith operations and producing brass castings and brass moldings.
- (4) Performing blacksmith operations, including tool forging and dressing, heat treating and spring making for the battalion.
- (5) Performing welding operations as required.

b. Limitations. This company is dependent upon headquarters company for billeting and mess and for supervision of organizational maintenance of plant facilities and motor vehicles.

177. Organization

The boiler and smith shop company is organized in accordance with TOE 55-238. An organizational chart for the company is shown in figure 11. The components of the company are as follows:

- a. Company headquarters.
- b. Boiler shop platoon.
 - (1) Platoon headquarters.
 - (2) Boiler section.
 - (3) Tank section.
 - (4) Welding section.
- c. Smith shop platoon.
- d. Pipe and tin shop platoon.

178. Functions

a. *Company Headquarters.* The company commander is the boiler and smith shop superintendent. Enlisted personnel in company headquarters include the first sergeant, supply sergeant, company administrative clerk, clerk typist, and transportation supply specialist. The functions of company headquarters are—

- (1) Administration of personnel assigned to the company.
- (2) Receipt and issue of technical materials and equipment.
- (3) Preparation of routine reports and organizational records.
- (4) Receipt, care, and issue of military supplies.

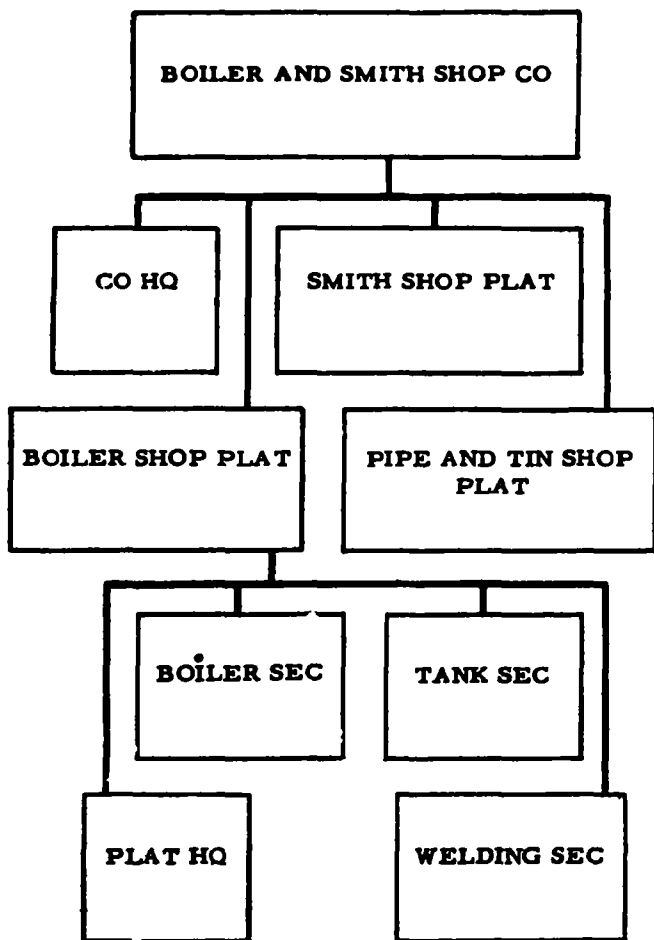


Figure 11. Organization—boiler and smith shop company.

b. *Boiler Shop Platoon.* Boiler shop platoon functions are as follows:

- (1) *Platoon headquarters.* The platoon commander (boiler shop superintendent) is in charge of the boiler, tank, and welding sections. He is assisted by a platoon sergeant who is a boiler shop foreman.
- (2) *Boiler section.* The boiler section functions under the supervision of the enlisted boiler inspector. Other enlisted personnel include a boiler shop section foreman, boiler repairmen, punch and shear operators, boiler layer-outs, and helpers. The functions of this section are as follows:
 - (a) Inspecting and diagnosing malfunctions in boilers, tenders, and fire boxes on steam locomotives and locomotive cranes.
 - (b) Dismantling, repairing, and overhauling boilers and fire boxes.
 - (c) Laying out, cutting, and shaping metal with oxyacetylene torches, power shears, saws, and shaping machines.
- (3) *Tank section.* The tank section functions under the supervision of the enlisted tank repair foreman. Other enlisted personnel include locomotive metal workers, car repairmen, car carpenters, and helpers. The functions of this section are as follows:
 - (a) Dismantling, repairing, and overhaul-

ing locomotive tenders, including trucks and brake rigging.

(b) Assisting boiler section by making necessary carpenter repairs to locomotive cabs.

(4) *Welding section.* The welding section functions under the supervision of the enlisted welder foreman. Other enlisted personnel include welders and helpers. The function of this section is to perform the welding work, both oxyacetylene and electric arc, for the entire boiler and smith shop company.

c. *Smith Shop Platoon.* The platoon commander is the smith shop superintendent. He is assisted by an enlisted smith shop foreman. Other enlisted personnel include blacksmiths, hammer-smiths, forging press operators, heat treaters, a tool dresser, a steam hammer operator, and helpers. The functions of this platoon are as follows:

(1) Scheduling shop work and preparing shop records and reports.

(2) Performing all blacksmith and forging work for the entire shop battalion, including heat treating, brazing, babbitting, production of brass castings, shaping metal into parts, and straightening and alining damaged parts.

(3) Dressing and sharpening tools.

d. *Pipe and Tin Shop Platoon.* The platoon commander is the pipe and tin shop superintendent. He is assisted by an enlisted pipe and tin shop

foreman. Other enlisted personnel include an assistant pipe and tin shop foreman, machinists, locomotive pipefitters, molders, car metal workers, and helpers. The functions of this platoon are as follows:

- (1) Scheduling shop work and preparing shop records and reports.
- (2) Performing all locomotive pipefitting, coppersmithing, and sheet metal work for the shop battalion.
- (3) Providing pipefitters for the erecting shop platoon.
- (4) Fabricating sheet metal articles.
- (5) Producing metal castings, other than brass.

Section IV. CAR REPAIR COMPANY

179. Mission

The mission of the car repair company (TOE 55-239) is to perform depot maintenance involving car repair work on freight and passenger cars in support of the mission of the railway shop battalion.

180. Capabilities

a. Capabilities. The capabilities of the car repair company are—

- (1) Dismantling, repairing, and assembling railway cars, passenger and freight, received by the battalion for repair.
- (2) Maintaining and repairing railway car air brake equipment.

- (3) Operating a railway car wheel and axle shop.
- (4) Woodworking, patternmaking, upholstering, canvas work, and machining operations on car parts.
- (5) All locomotive and car painting for the battalion.
- (6) Assembling new freight and passenger cars.

b. Limitations. This company is dependent upon headquarters company for billeting and mess and for supervision of organizational maintenance of plant facilities and motor vehicles.

181. Organization

The car repair company (fig. 12) is organized in accordance with TOE 55-239. The components of the company are as follows:

- a.* Company headquarters.
- b.* Stripping and erecting platoon.
 - (1) Platoon headquarters.
 - (2) Stripping section.
 - (3) Erecting section.
- c.* Fabricating and woodworking platoon.
- d.* Finishing platoon.
 - (1) Platoon headquarters.
 - (2) Passenger car section.
 - (3) Freight car section.

182. Functions

a. Company Headquarters. The company commander is the car shop superintendent. Enlisted

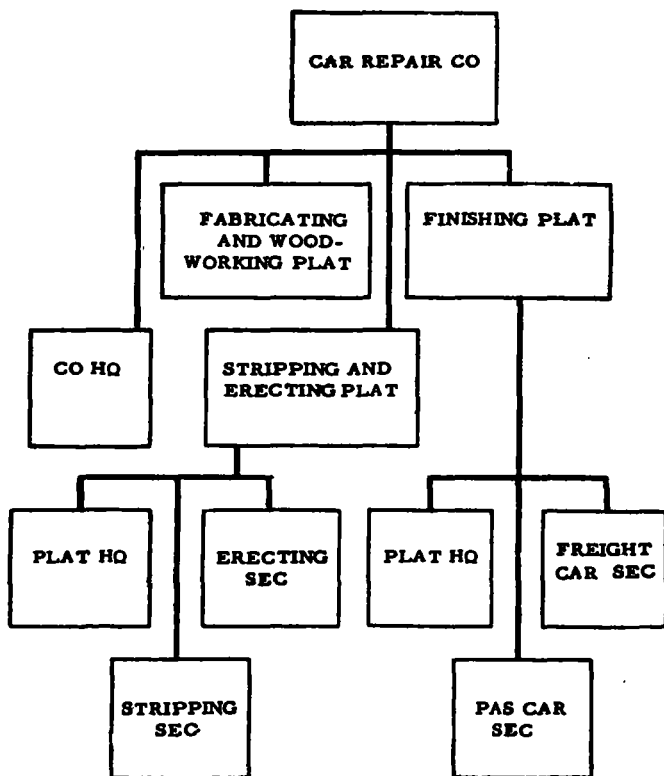


Figure 12. Organization—car repair company.

personnel in company headquarters include the first sergeant, supply sergeant, company administrative clerk, transportation supply specialist, clerk typist, and crane operators. The functions of company headquarters are as follows:

- (1) Administration for all personnel assigned to the company.

- (2) Receipt and issue of technical materials and equipment.
- (3) Receipt, care, and issue of military supplies.
- (4) Preparation of routing reports and organizational records.
- (5) Operation and maintenance of the crane used by the stripping and erecting platoon and the fabricating and woodworking platoon.

b. Stripping and Erecting Platoon. Stripping and erecting platoon functions include the following:

- (1) *Platoon headquarters.* The platoon commander, a car shop superintendent, is in charge of and coordinates the work of the stripping and erecting sections. He is assisted by an enlisted car shop foreman, the platoon sergeant.
- (2) *Stripping section.* An enlisted car shop foreman supervises the work of the stripping section. Other enlisted personnel assigned to the section include car carpenters, car repairmen, welders, and helpers. The functions of this section are as follows:
 - (a) Dismantling or stripping all railway freight cars received by the battalion for repair.
 - (b) Delivering bad order parts to the shop section or company responsible for repair.

(3) *Erecting section.* An enlisted car shop foreman supervises the work of the erecting section. Other enlisted personnel assigned to the section include car repairmen, air brake repairmen, welders, and helpers. The functions of this section are as follows:

(a) Performing repairs and assembling cars, using parts or subassemblies received from stock, other sections, or other companies. Operations normally include repairing frames, applying steel framing, bolting, reaming, and riveting.

(b) Delivering assembled cars to the finishing platoon.

c. Fabricating and Woodworking Platoon. The platoon commander, a car shop superintendent, is in charge of the work of the fabricating and woodworking platoon. He is assisted by an enlisted car shop foreman. Other enlisted personnel assigned include railway car carpenters, machinists, patternmakers, car repairmen, welders, blacksmiths, a railway car metal worker, and helpers. The functions of this platoon are as follows:

(1) Repairing car subassemblies.

(2) Fabricating and applying floors, wood sidings and ends, roofs, running boards, and doors.

(3) Operating the wheel and axle shop.

d. *Finishing Platoon.* The functions of the finishing platoon include—

- (1) *Platoon headquarters.* The platoon commander, a car shop superintendent, is in charge of and coordinates the work of the passenger car and freight car sections. He is assisted by an enlisted car shop foreman, the platoon sergeant.
- (2) *Passenger car section.* The passenger car section operates under the supervision of an enlisted car shop foreman. Personnel assigned to the section include railway car carpenters, car repairmen, cabinet makers, welders, upholsterers, painters, and helpers. The functions of this section are as follows:
 - (a) Dismantling and assembling passenger cars.
 - (b) Performing all painting for the battalion, including painting of locomotives, passenger cars, and freight cars.
 - (c) Reupholstering seats, making or repairing cabinets, and performing canvas work.
 - (d) Performing mechanical repairs of a minor nature.
- (3) *Freight car section.* An enlisted car section foreman supervises the work of the freight car section. Other enlisted personnel include air brake repairmen, car carpenters, car repairmen, welders, car metal workers, a sheet metal worker, a

glazer, an electrician, and helpers. The functions of this section are as follows:

- (a) Completing assembly of freight cars.
- (b) Performing air brake rehabilitation for the company.
- (c) Assisting the passenger car section in making repairs to car windows and in electrical work.

Section V. DIESEL-ELECTRIC LOCOMOTIVE REPAIR COMPANY

183. Mission

The mission of the diesel-electric locomotive repair company (TOE 55-247) is to perform depot maintenance and inspection on diesel-electric locomotives in support of the mission of the railway shop battalion.

184. Capabilities

a. Capabilities. Company capabilities are—

- (1) Dismantling, repairing, assembling, and testing diesel-electric locomotives received by the battalion for repair.
- (2) Assembling and testing new diesel-electric locomotives received by the battalion.
- (3) Repairing undercarriages, wheels, bearings, draft gear, safety appliances, headlight equipment, and foundation brake gear.

- (4) Removing, repairing, and installing traction motors.
- (5) Removing, repairing, and installing diesel engines.
- (6) Repairing, winding, baking, and testing armatures.
- (7) Repairing electrical control equipment, panelboards, motors, and electric switches.

b. Limitations. This company is dependent upon headquarters company for billeting and mess, and for supervision of organizational maintenance of plant facilities and motor vehicles.

185. Organization

The diesel-electric locomotive repair company (fig. 13) is organized in accordance with TOE 55-247. The components of the company are as follows:

- a.* Company headquarters.
- b.* Diesel engine platoon.
- c.* Diesel-electrical platoon.

186. Functions

a. Company Headquarters. The company commander is the diesel locomotive shop superintendent. An enlisted diesel-electric locomotive repair control sergeant assists the shop superintendent in the performance of technical railway shop duties. The locomotive hostlers operate the locomotives in the shop and in and around the shop yard. The crane operators support both the diesel

engine and the diesel-electrical platoons. Other personnel assigned to company headquarters include the first sergeant, supply sergeant, transportation supply specialist, company administrative clerk, and clerk typist. The functions of company headquarters are as follows:

- (1) Administration for all personnel assigned to the company.
- (2) Receipt and issue of technical materials and equipment.

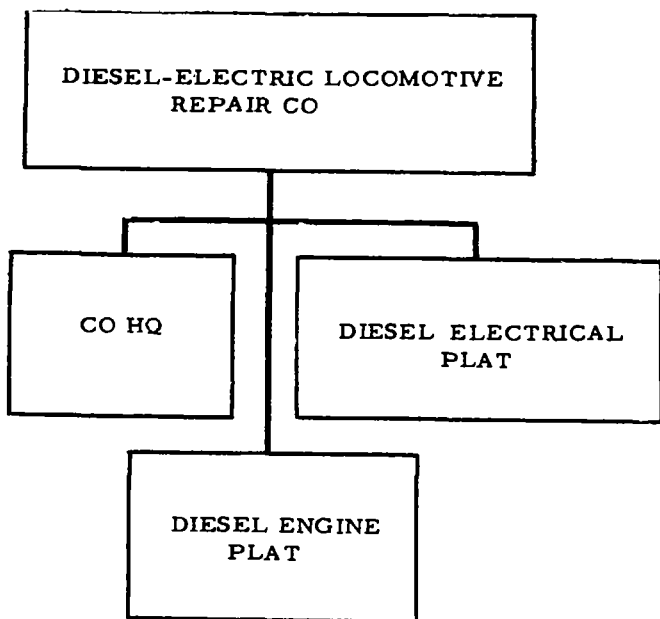


Figure 13. Organization—diesel-electric locomotive repair company.

- (3) Preparation of routine reports and organizational records.
- (4) Receipt, care, and issue of military supplies.
- (5) Inspection of diesel-electric locomotives received for repair.
- (6) Operation and maintenance of all cranes for the company.
- (7) Performance of hostler service for the company.

b. Diesel Engine Platoon. The platoon commander is a diesel locomotive shop superintendent. The platoon sergeant is a diesel-electric locomotive shop foreman and is assisted by an assistant diesel-electric locomotive shop foreman. Other personnel assigned to the platoon include diesel-electric locomotive repairmen, air brake repairmen, a toolroom keeper, and helpers. This platoon has 12 teams of mechanics. Each team consists of one senior diesel-electric locomotive repairman, two diesel-electric locomotive repairmen, and one helper. One team is normally assigned to a diesel-electric locomotive unit. These teams are capable of operating a shop 24 hours a day, using two shifts of six teams per shift. The diesel-electric shop foreman will normally be in charge of the first shift and the diesel engine section foreman in charge of the second shift. The functions of this platoon are as follows:

- (1) Dismantling and assembling diesel-electric locomotives received by the company for repair.

- (2) Inspecting air brake systems and making minor repairs to locomotive carbody. Major repairs to locomotive carbody may be performed by boiler and smith shop personnel.
- (3) Operating the toolroom and stockroom for the platoon.
- (4) Repairing diesel engines while in place in locomotives or removing, repairing, and installing engines.
- (5) Repairing electric and diesel-electric locomotive wheels, bearings, draft gear, and safety appliances.
- (6) Assisting the diesel-electrical platoon in assembling and testing new locomotives.

c. Diesel-Electric Platoon. The platoon commander is a diesel locomotive shop superintendent. The platoon sergeant is a diesel-electric locomotive shop foreman and is assisted by an assistant diesel-electric locomotive shop foreman. Other personnel assigned to this platoon include diesel-electric locomotive electricians, electric motor repairmen, battery repairman, toolroom keeper, and helpers. This platoon has six teams of electricians. Each team consists of one senior diesel-electric locomotive electrician, two diesel-electric locomotive electricians, and one helper. One team is usually assigned to a diesel-electric locomotive unit. These teams are capable of operating a shop 24 hours a day, using two shifts with three teams per shift. The diesel locomotive shop superintendent will normally be in charge of the first shift and the diesel-electric locomotive shop fore-

man in charge of the second shift. The functions of this platoon are as follows:

- (1) Dismantling, repairing and assembling traction motors and generators.
- (2) Repairing, winding, baking, and testing armatures.
- (3) Repairing electrical control equipment, panelboards, electric switches, and headlight equipment.
- (4) Operating the toolroom and stockroom for the platoon.
- (5) Assisting the diesel engine platoon in assembling and testing new locomotives.
- (6) Charging, handling and servicing batteries.
- (7) Washing and servicing steam generators.

Section VI. BATTALION AUGMENTATION

187. General

The units of the railway shop battalion previously presented in this chapter are standard organizations designed to meet average requirements under general operating conditions. However, conditions vary considerably between theaters or within any one theater at different times. To deal effectively with these varying requirements, TOE 55-500 lists supplementary teams which may be attached or assigned to the railway shop battalion. The railway workshop (mobile), which may be used in support of the mission of the railway shop battalion, is also listed in TOE 55-500.

188. Railway Workshop (Mobile) (Team EP)

a. Mission. The mission of the railway workshop (mobile) is to perform field maintenance on steam and diesel-electric locomotives and railway cars in forward areas where stationary facilities are inadequate.

b. Assignment. The railway workshop (mobile) is assigned to headquarters and headquarters company, transportation railway group. It is normally attached to headquarters and headquarters company, transportation railway operating battalion.

c. Organization. This unit is commanded by a railway master mechanic, assisted by the diesel locomotive shop superintendent. Enlisted personnel assigned include the following:

- (1) Steam locomotive repair foreman and assistant.
- (2) Diesel-electric locomotive repair foreman and assistant.
- (3) Diesel-electric locomotive electricians.
- (4) Diesel-electric locomotive repairmen.
- (5) Railway car repairmen.
- (6) Steam locomotive repairmen.
- (7) Boiler repairmen.
- (8) Locomotive pipefitters.
- (9) Machinists.
- (10) Blacksmith.
- (11) Electrician.
- (12) Air brake repairmen.
- (13) Helpers.

d. Equipment. The railway workshop (mobile) is equipped with back shop repair and erecting

machinery which can be installed in railway cars and moved to points in the theater beyond the service facilities of a railway shop battalion. The equipment of this unit may be mounted in a train of boxcars consisting of five Transportation Corps 40-ton cars, six Transportation Corps 30-ton cars, or the equivalent in foreign cars. Additional cars for mess and quarters may be added if required. When 40-ton cars are used, only one car will be required for machine shop service. If 30-ton cars are used, two connected cars will be required. The equipment cars consist of the following:

- (1) Machine shop car(s).
- (2) Diesel-air-brake-electric car.
- (3) Pipe shop-forge-welding car.
- (4) Power plant car.
- (5) Shop stores car.

e. Functions. The functions of the railway workshop (mobile), team EP, are to—

- (1) Provide back shop support to enable an early beginning of rail operations during the initial phase of entry into the theater before the arrival of a railway shop battalion.
- (2) Facilitate rapid expansion of transportation railway service by affording mobile shop facilities in advance of the railway shop battalion.
- (3) Perform sufficient repairs to war-damaged equipment in forward areas to restore such equipment to service or permit its removal to a railway back shop.

- (4) Perform repairs in forward areas in order to maintain equipment in an operable condition and avoid long distance returns of such equipment to a railway back shop.
- (5) Augment a railway shop battalion in lieu of an additional shop battalion.
- (6) Provide the power and machine tools necessary to operate a railway shop in a devastated area.

189. Maintenance of Equipment Teams

a. The following TOE 55-500 teams are available for augmentation of railway shop battalions. Normally, these teams are assigned to the railway shop battalion and further assigned to the company with which working. The titles of the following teams indicate their functions:

- (1) Team ED—diesel-electric locomotive maintenance crew.
- (2) Team EF—steam locomotive maintenance crew.
- (3) Team EG—railway car repair crew.
- (4) Team EJ—diesel-electric locomotive maintenance crew.
- (5) Team EM—steam locomotive maintenance crew.
- (6) Team EN—railway car repair crew.

b. Teams ED, EF, and EG contain the same technical specialists, respectively, as teams EJ, EM, and EN. The major difference is that teams ED, EF, and EG contain approximately one-half the personnel, respectively, of teams EJ, EM, and EN.

CHAPTER 16

TACTICS AND TECHNIQUES

190. Relations to Arms and Other Services

a. Close cooperation between the railway shop battalion and the arms and other services is frequently necessary. By reason of its capabilities, the battalion is often called upon to make emergency repairs to heavy equipment belonging to other organizations. For uniform procedure and the establishment of proper priorities, arrangements for work of this nature are made through higher headquarters, the railway shop battalion receiving instructions through regular command channels. The battalion commander cooperates fully with the other organizations to effect any such repairs promptly.

b. The railway shop battalion has the usual contacts with the various services for the supply of the battalion. The bulk of the supplies for shop operation, including lumber, timber, and gases for welding and cutting, is drawn from the Corps of Engineers. This runs into heavy volume, and close cooperation and efficient handling are required.

c. Security in the communications zone is the responsibility of the area commander (FM 100—

10). The battalion commander cooperates with the area commander in the area defense and the area damage control plans, and is responsible for local security.

191. Support

a. The railway shop battalion supports a military operation by performing depot maintenance on the railway equipment of a military railway.

b. Normally in phase I operations the battalion is assigned to a railway group in support of two to four railway operating battalions which are engaged in the logistical support of combat operations.

192. Employment of the Battalion and Distribution of Personnel

a. The transportation railway shop battalion is employed by the transportation railway group or railway command to perform depot maintenance on railway locomotives and rolling stock in the theater of operations. Under normal operating conditions, the shop battalion is located at a local shop plant if available. Maximum use is made of the existing shop machinery and other facilities. If the battalion must set up its organizational equipment, the site selected should be one conducive to maximum production in accordance with the battalion mission.

b. The shop battalion is a balanced unit for employment at the established shop plant. Small groups on special assignments may be needed at outlying points to facilitate maintenance and re-

pair work beyond the capacity of the railway operating battalion.

193. Maintenance Standards and Safety Practices

a. Policies for the maintenance of equipment are prescribed by the equipment section of the highest echelon of the transportation railway service in the theater. Maintenance standards will be the highest that conditions and available facilities permit, based on military necessity. As conditions stabilize and additional railway equipment becomes available, maintenance standards are constantly improved.

b. Every effort consistent with the efficient accomplishment of the mission will be made to provide safety for personnel and equipment. Constant efforts will be exercised toward attainment of normal safety standards.

c. The safety standards in military railway shops may not be commensurate with United States commercial railway standards. The battalion commander will insure that all personnel are familiar with actual conditions and that due precautions are taken.

194. Plans

a. Battalion planning is a necessary and continuing process. Plans must be prepared for any possible course of action before the need arises, without waiting for an order from higher echelons (FM 101-5).

b. Plans must be adequate, practical, and thorough, yet sufficiently flexible to meet any

changes in the situation. Coordination between the battalion and higher headquarters through conferences and visits insures that no problems are overlooked and that solutions are obtained promptly.

c. The battalion commander and staff must assure that subordinate commanders and others responsible for the execution of battalion plans are kept fully informed as the plans progress.

d. The location of the shop is planned with respect to railway operation and existing shop facilities. The battalion may be required to set up in a war-damaged shop facility. In such a case, all new construction is planned so that future expansion for increased capacity will be possible.

e. Operational planning should include information on the number and type of locomotives and cars available. This information is kept current to show all additional equipment secured, including war-damaged equipment restored to service. Shop operations can then be planned to meet the maintenance load. Work is programmed monthly and performance charts maintained.

f. With the information discussed in *e* above, the supply officer is able to plan for the supplies and materials necessary to support the shop operation. His plans include the locations of sources of supply and estimates of quantities required. Further local planning will include transportation and handling of supplies and the possible utilization of any available local civilian labor.

g. The battalion commander constantly estimates the situation and prepares plans for expansion and improvements to the shop facilities which will increase battalion operational efficiency and capabilities.

h. Before leaving the zone of interior, if possible and consistent with military security measures, the battalion commander, his staff, and subordinate commanders secure all available information on the railroads, type of operation, power, and equipment in the country in which they will operate.

195. Orders

a. An order is a formal statement by a commander announcing his decisions, plans, or instructions. By orders issued to his staff and subordinate commanders, the battalion commander puts his decisions, plans, and instructions into effect. Orders may be issued personally or by the staff in the name of the battalion commander.

b. When complete orders cannot be issued, essential details should be issued in fragmentary form in the manner best suited to the situation. Orders should be written messages, letters, bulletins, etc. Oral orders should be confirmed by written media.

c. Standing operating procedures carry the same weight as orders and should be employed to establish standard methods whenever practicable. They prescribe the regular procedure to be followed in the absence of instructions to the con-

trary. Their use promotes a clear understanding of instructions by all concerned, which facilitates and expedites operation.

196. Records and Reports

a. To exercise efficient command and technical supervision of battalion operations, the railway group headquarters must receive periodic operational reports and statistical information from the railway shop battalion. The companies of the battalion and any outlying groups or detachments make reports to battalion headquarters. The headquarters consolidates the reports and furnishes the information to railway group headquarters. The consolidated information then goes through channels to the highest echelon of the transportation railway service.

b. Reports required by higher headquarters may include—

- (1) Report showing the number of cars and locomotives on which repairs were completed, the number undergoing repairs, and the number on hand awaiting repairs.
- (2) Report on the material and supply situation, made daily or weekly.
- (3) Report on new equipment assembled.
- (4) Report on local civilian employees when utilized, showing number employed and number available for duty.
- (5) Report of all accidents and personal injuries occurring at the main shop facility or outlying locations.

- (6) Progress reports on particular projects.
- (7) Report on any special or unusual occurrences.
- (8) Such other reports as may be necessary and prescribed by group headquarters.

c. At times, the urgency of the situation may cause requests for information to be made directly to elements of the battalion by the office of the transportation officer. Full cooperation will be accorded such requests. A report of the information furnished will be given the battalion commander promptly.

d. Officers and enlisted personnel in charge of making reports are responsible for seeing that carbon copies or book records of all special and routine reports are retained. These are a part of the battalion permanent records and will be duly safeguarded until proper disposal instructions are received by the battalion commander. (Disposal instructions will conform to AR 345-905 and theater standing operating procedure.)

CHAPTER 17

SHOP FACILITIES AND SHOP FUNCTIONS

Section I. SHOP FACILITIES






197. Shop Layout

a. General. Since inclement weather may damage the battalion's machinery, the majority of shop operations must be performed under cover. Normally many buildings are utilized, but in modern installations an attempt has been made to house as many of the separate shops as possible in one structure. In such cases, each shop in the building is located to provide the greatest efficiency possible in receiving, repairing or replacing, and returning parts for installation to the main shop area. The diesel-electric locomotive repair shop and the buildings housing steam locomotives are usually set apart from each other because coal-gas fumes, soot, ash dust, and smoke are injurious to the electrical assemblies of diesel-electric locomotives. Typical shop layouts are shown in figure 14.

b. Car Shop. The main car shop building is usually a long structure with tracks extending the length of the building, which may or may not have a transfer table. Subshops located in or near the

TRANS RY SHOP BN

TOE 55-235

	HQ. & HQ. CO.	(HQ. CO.) TOE 55-236
	ERECTING & MACHINE SHOP	(CO. A.) TOE 55-237
	BOILER & SMITH SHOP	(CO. B.) TOE 55-238
	CAR REPAIR CO.	(CO. C.) TOE 55-239
	DIESEL-ELECTRIC LOCO SHOP	(CO. D.) TOE 55-247

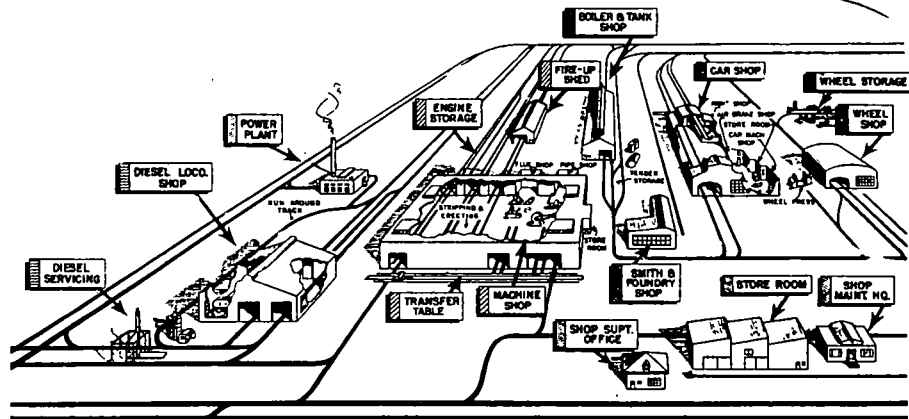


Figure 14. A typical shop layout.

main building include the wheel, paint, air brake, car machine, and carpenter shops.

c. Locomotive Shop. There are three types of locomotive back shops—longitudinal, transverse, and combination. The longitudinal type has erecting tracks extending the length of the building; the transverse shop has erecting pits arranged side by side; the combination shop has tracks in both positions. The locomotives enter the longitudinal shop at one end and move along the track progressively through the various stages of repair. The transverse shop usually has a transfer table located at one end, providing access to all pits. When no transfer table is provided, the locomotives enter a single track and are moved by large cranes to the track desired. Subshops located in or near the locomotive shop include the machine, air brake, flue, pipe, boiler, tank, welding, blacksmith, and foundry shops.

198. Utilization of Existing Facilities

Railway shop battalions will normally be located at large terminals in order to take advantage of the existing permanent type shop buildings and heavy work equipment that may be intact at these locations. Such facilities are exploited to the fullest extent. Although construction of new shop buildings in a theater of operations is unusual, at times it will be found that new facilities must be provided or that extensive repairs to existing facilities are necessary because of war damage. In such cases, assistance will be re-

quested, through channels, from the Corps of Engineers.

199. Shop Equipment

a. Class II Items. Class II items of shop equipment are listed in the TOE of the companies of the shop battalion. These items constitute the minimum essential equipment required to operate a railway back shop.

b. Class IV Items. Class IV items of shop equipment are items for which no allowances are prescribed. Although these class IV items are listed in the TOE of the companies of the railway shop battalion, they will not be requisitioned in the theater of operations until it is determined that similar items of equipment are not available from local civilian sources.

200. Improvising Shop Equipment

In the theater of operations, particularly during the early phase of an operation, it may be necessary to improvise required shop equipment. Existing shop equipment may be found damaged or destroyed, and delay will be encountered in obtaining class IV items. Substitutions may also be made for special items of equipment. For example, in the early stages of the operation, line shafts may be turned with gasoline engines or other substitute power, and jacks used in the absence of heavy cranes. The extent of improvisation is limited only by the ingenuity of the personnel of the battalion.

Section II. SHOP FUNCTIONS

201. Initial Rehabilitation of Local Locomotives and Cars

In the initial stages of rail operation, requirements for both locomotives and cars are met by using the equipment left in the country in which the operation is taking place. Extensive repairs to such equipment are not contemplated at this stage. Only the minimum repairs to put the maximum amount of equipment in operating condition will be performed. Whenever possible, badly damaged locomotives and cars are cannibalized to secure parts and assemblies to rehabilitate less damaged locomotives and cars.

202. Standard Shop Functions

Routine operations of the railway shop battalion include heavy repairs to railway motive power, heavy repairs to railway cars, repair of subassemblies, manufacture of replacement parts, and assembly of railway locomotives and cars.

203. Repairing Locomotives

a. Diesel-Electric Locomotives. Diesel-electric locomotives are maintained on a progressive or preventive basis rather than on the periodic basis of heavy overhaul characteristic of steam locomotive repairs. Two classes of work are performed on diesel-electric locomotives.

- (1) *Class I (first, second, and third echelon) routine servicing and regular inspection.* Class I work includes fueling, watering, sanding, adding of lubrication oil, daily

inspection, and general check of diesel engines, electrical equipment, mechanical parts, air brakes, and safety appliances, all of which are necessary to release the locomotive for its next run in road service or tour of duty in switching service. This work is performed by the railway operating battalion.

- (2) *Class II (fourth and fifth echelon) maintenance and repair.* Class II work includes inspection, lubrication, and all repairs or replacements of parts required as the result of continued operation or failures in service. This work is performed by the railway shop battalion.

b. Steam Locomotives. Steam locomotive repairs follow the five echelon system. Normally, railway operating battalions will be responsible for first, second, and fixed third echelon repairs. Railway workshops (mobile) will be responsible for third echelon repairs in forward areas. Railway shop battalions will be responsible for fourth and fifth echelon repairs with forward area assistance by railway workshops (mobile). The commercial railroad equivalent of fourth and fifth echelon repairs is divided into five classifications of repairs, from class I, which includes the heaviest repairs, to class V. In the transportation railway service, first, second, and third echelon repairs are frequently referred to as running repairs and include only that work necessary to keep equipment in operating condition. Fourth and fifth echelon repairs are referred to as heavy

repairs and include repairs that add to the life of equipment. The work for each echelon of repairs consists of —

- (1) *First echelon.* First echelon maintenance involves preventive maintenance, including inspection of moving parts, lubrication, and minor adjustments.
- (2) *Second echelon.* Second echelon maintenance consists of preventive maintenance, such as inspection; adjustments; replenishing of lubricants, fuel, water, sand, and other necessary supplies; minor repairs such as replacing headlight bulbs, applying new brake shoes and air brake hose, and adjusting brakes; application tests of air brake equipment; inspection of engine for fuel and lubricating oil leaks; inspection of running gear; boiler washouts; repairs to running gear necessitated by normal wear; repairs to lubricating and fuel systems; removal of wheels for turning; repairs to flues and tubes; and other repairs requiring only partial dismantling of the equipment.
- (3) *Third echelon.* Any repairs necessary to restore damaged railroad equipment to operation on the railroad right-of-way or for movement to a fixed installation for proper repairs are third echelon maintenance.
- (4) *Fourth echelon.* Fourth echelon maintenance includes reconditioning, applica-

tion of a new boiler or back end, turning or replacing tires, renewing or resetting flues, rebuilding or overhauling engines, repairing electrical apparatus, and all necessary repairs to machinery.

- (5) *Fifth echelon.* Fifth echelon maintenance involves reconditioning equipment completely, including reclamation and limited manufacture.

204. Repairing Rolling Stock

Rolling stock repairs follow the five echelon system. Normally railway operating battalions and ambulance train maintenance sections and crews will be responsible for the first three echelons of repairs, and railway shop battalions for the fourth and fifth echelons. Fourth and fifth echelon repairs are sometimes defined as those involving over 40 man-hours of work per car. The work for each echelon of repairs consists of—

a. First Echelon. First echelon maintenance includes inspection of air brakes, brake gear, running gear, draft gear, and other equipment; and examination and lubrication of journal boxes.

b. Second Echelon. Replacing brake shoes; applying new air hose; adjusting brakes; applying journal brasses; repacking journal boxes; applying oil in journal boxes; and repairs to draft gear, trucks, air-conditioning, heating, and lighting equipment are all second echelon maintenance functions. Such repairs will not require cars to be taken out of service.

c. Third Echelon. Third echelon maintenance involves changing defective wheels, journals, side

frames, couplers, draft gear, and air brake parts; repairs to trucks and piping; and minor repairs to car body. Such repairs will require cars to be taken out of service for a short time only. In addition, on passenger equipment and hospital cars, third echelon repairs consist of daily, weekly, monthly, semiannual, and annual inspections; cleaning of equipment; deodorizing and changing filters and evaporators; inspection, lubrication, and minor repairs to air-conditioning, heating and car lighting equipment; charging of batteries; maintenance of water systems and coolers; repair and replacement of hardware and linens; and cleaning evaporators.

d. Fourth Echelon. Fourth echelon maintenance consists of truck, wheel, and axle inspection and repair; draft gear inspection and repair; air brake inspection, cleaning, and repair; inspection and repair of hangers and supports for underneath equipment; and inspection and repair of safety appliances and appurtenances. Such repairs are more extensive than running repairs.

e. Fifth Echelon. Fifth echelon maintenance includes repairing, reconditioning, and rebuilding cars and replacing all worn parts with new or rehabilitated parts. It usually incorporates reclamation and limited manufacture. Such work adds a definite extension to the life of the car.

205. Repairing Subassemblies

Repair of subassemblies normally includes all air brake operating equipment, feed-water pumps and injectors, generators, diesel engines, traction

motors, gages, cocks, valves, springs, and so forth. Such repairs are preferably done by the shop battalion, which has special repair and test facilities. Further, the shop battalion is better organized for such production work than the operating battalions. Some complete spare assemblies are furnished to the operating battalions for their installation.

206. Manufacturing, Finishing, or Rebuilding Replacement Parts

Parts manufactured, finished, or rebuilt by the shop battalion normally include replacement parts not available from depots, and finished or semi-finished material furnished the operating battalions. The latter includes pistons and crossheads, motion-work parts, main and side rods, rod bushings, driving tires, boxes, bolts, springs, brake-rigging pins, wheels, air brake materials, injectors, water pumps, headlight generators, batteries, flues, arch brick and tubes, safety appliances, bolsters, side frames, draft and draw gear parts, and other similar items.

207. Periodical Repairs Resulting From Normal Wear

In a theater, normal wear accounts for the majority of repair work. This is especially true of native rail equipment, which initially may be found in rather poor condition. By routing equipment to the shop periodically, normal-wear repairs can be taken care of before total equipment failure. Equipment failure while on the road under load delays not only the freight but it reduces traffic density when trains have trouble en route. While accurate mileage records may not

always be available, the proper use of inspection reports provides a means of knowing when repairs are necessary. Following are examples of required periodical inspections, tests and repairs:

a. Steam Locomotives. Periodic tests and repairs include—

- (1) *Each trip.* Water glass must be blown out and gage cocks and injectors tested.
- (2) *Monthly.* Staybolts must be tested and the boiler washed.
- (3) *Every 3 months.* Boiler steam gages and safety valves, air gages, draw gear, and air compressors must be tested.
- (4) *Every 6 months.* Air brake valves must be tested and cleaned.
- (5) *Every 12 months.* Hydrostatic test of boiler and main air brake reservoir must be made.
- (6) *Every 24 months.* Caps must be removed for testing flexible staybolts.
- (7) *Every 4 years.* Boiler flues must be removed.
- (8) *Every 5 years.* Boiler jacket and lagging must be removed.

b. Diesel-Electric Locomotives. Diesel-electric locomotives are maintained on a progressive or preventive basis rather than on the periodic basis of heavy overhaul as in the steam locomotive. Inspections, tests, and repairs are made as follows:

- (1) Daily inspection (DD Form 862), Daily Inspection Work Sheet for Diesel Locomotives.

- (2) Monthly inspection (DD Form 863), Monthly and Semiannual Inspection Work Sheet for Diesel Locomotives.
- (3) Annual inspection (DD Form 864), Annual Inspection Work Sheet for Diesel Locomotives.

c. Rolling Stock. The type of equipment to be given major repairs is set up by the requirements of the Transportation Department. Close cooperation with higher headquarters is necessary to prevent expenditure of labor and material on unneeded equipment. Minor repairs will be made in conjunction with the inspections made on each train arriving at or leaving a terminal or originating point. Periodic inspections, tests, and repairs may include the following:

- (1) *Freight cars.* Requirements on freight cars are as follows:
 - (a) *Every 15 months.*
 1. Cleaning and reconditioning air brake systems (other than AB type).
 2. Repacking journal boxes.
 - (b) *Every 4 years.* Cleaning and reconditioning AB type air brakes.
- (2) *Passenger cars.* Passenger car inspections include—
 - (a) *Trip inspection.* Visual inspection by car inspectors and train crews.
 - (b) *Every 6 months.* Repacking journal boxes. Changing lubricator pads when worn or defective.
 - (c) *Every 12 months.* Cleaning and test-

ing air brake systems (other than UC and D-22 type valves).

- (d) *Every 15 months.* Cleaning and testing UC type air brakes.

208. Repairs Resulting From Accidents and Neglect

Rail equipment—and particularly cars—normally has a long life. However, such equipment may be made unserviceable by enemy action, sabotage, wrecks, switching impacts, draft gear strains caused by rough locomotive handling, hot boxes, and general neglect.

a. *Accidents.* The time and manpower required to repair damage caused by accidents should be weighed against the availability of new equipment. The manpower and material required to assemble new equipment in a theater are much less than that required for maintenance of stocks and repair parts to rebuild damaged cars. Therefore, it is often preferable to strip badly damaged equipment for the spare parts rather than to rebuild such cars. Approximately 50 cars per 10,000 in service may be expected to be damaged daily.

b. *Neglect.* Necessary repairs to cars which have been neglected may be confined to wearing parts or may involve extensive damage to parts not readily replaced, such as boiler damage caused by low or bad water, and by neglecting boiler washouts. Where the damage is extensive, the procedure governing repair because of accidents will generally be followed.

209. Miscellaneous Repair Services

Miscellaneous repair services performed by the shop battalion include repairs to cranes, maintenance of way equipment, tracked equipment other than rolling stock and motive power, and other equipment similar to that used by other arms and services. The repair work in the battalion may also include salvage work, and repairs to captured enemy equipment. Many of these operations disrupt the smooth-running functions of the shops, and they are best scheduled apart from the normal work so far as is possible. Logically, such work should be held to the minimum.

210. Maintenance of Plant and Machinery

The plant maintenance section of the headquarters and headquarters company maintains and repairs all buildings, facilities, tools, machinery, powerhouse boilers, pumps, air compressors, and generators for all companies of the battalion.

CHAPTER 18

MANAGEMENT, SUPERVISION AND SCHEDULING

211. Management

a. Capable management and management improvement are command responsibilities. In the railway shop battalion, management encompasses the organization, direction, planning, control, and coordination of the battalion and all of its operations. Included are the proper procedures in effective employment of all available resources and personnel. These functions require constant attention.

b. Plans must be simple yet comprehensive. They should be made for the current operation and should include planning for the future, as well as for making changes when operations change. Personnel administration, including morale, is an important aspect of management planning.

c. The battalion is organized to form a balanced unit. Proper control must be exercised so that the organization is properly and fully employed to achieve maximum production. The definite assignment of both responsibility and authority is essential to accomplish the desired mission. The

responsibilities and functions of units subordinate to the battalion must be clearly defined.

212. Overall Operational Supervision

a. The battalion commander is responsible for the operation of the shop facilities assigned to his battalion. The executive officer assists with operation and supervision and acts for the commander when the latter is absent. Subordinate commanders to the commander are responsible for the efficient operation of their departments.

b. The commander delegates authority to those he holds responsible for the operation. Command inspections are made regularly to secure efficient operation and maximum performance and output.

c. The battalion commander maintains close contact with higher headquarters, keeping informed on all matters that affect shop operations. He may obtain information from higher headquarters on any new equipment uncovered or arriving from the zone of interior which will be assigned to battalion territory and jurisdiction.

d. Through his executive officer, staff, and subordinate commanders, the battalion commander keeps informed on shop operations, supply matters, utilization of personnel, and the work flow in and out of the repair shops.

213. Departmental Supervision

a. Shop operations are normally spread over a wide area, and require a large number of buildings and a considerable amount of equipment and tools. Shop operation is divided into depart-

ments, which are subdivided into sections for the performance of various types of work.

b. The departments are operated by the companies of the battalion and the subdivisions by the platoons and sections of the companies as indicated by the organization. Company commanders must exercise proper supervision over their departments, including sections, to insure that work is carefully planned and distributed to the sections so that production requirements are met. The department superintendent is responsible for both the quality and quantity of the work.

c. The work of the various sections must be coordinated and balanced. For example, the boiler and repair section should not be overloaded with heavy boiler work while the machine section is idle. This condition can be controlled by the judicious selection of locomotives taken in for repairs. The superintendents of the departments must keep the shop superintendent fully informed of the workload and the progress of their departments and sections.

214. Operational Scheduling of Locomotives

a. The proper scheduling of work through the locomotive and car shops is essential to maximum production. The wide variety of work and the large number of shop departments and sections, each performing a part of the work on some major jobs, demand close control, supervision and coordinated performance. Figure 15 indicates a typical flow of such work.

b. The master schedule and the schedule board

TRANS RY SHOP BN WORK FLOW CHART

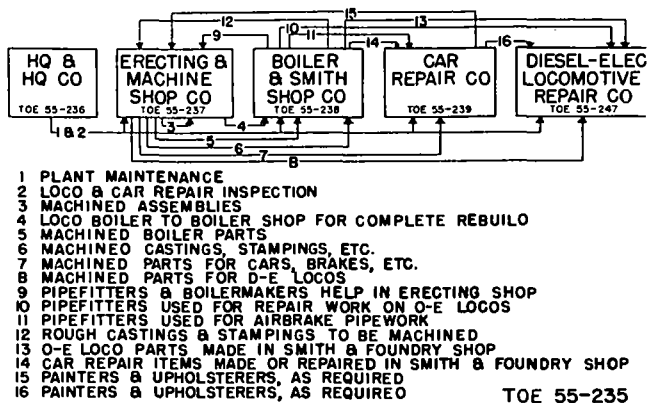


Figure 15. A work flow chart.

are means of keeping posted the work planned. The schedule shows graphically the plan of the work.

c. The work report received from the railway operating battalion when a locomotive is sent to the shop, enables the shop superintendent to include the locomotive in the master schedule and the supply officer to plan the material requirements. The locomotive is inspected on arrival at the shop to verify the general condition. The master schedule shows the date on which the work begins and the estimated completion date.

d. When the locomotive comes into the shop, it is stripped to the extent necessary to perform

the repairs. During stripping, a detailed inspection is made. The parts requiring repair are sent to the appropriate sections of the shop. The parts which are removed and do not require repairs are stored in an assigned area where they will be readily available when the locomotive is reassembled. The repair jobs are phased into the operation of each section and scheduled for completion so that the complete locomotive is ready for operation in accordance with the time shown on the master schedule.

e. The following repair work occurs simultaneously:

- (1) The erecting and machine shop company makes repairs to locomotive machinery and parts, such as overhauling the motion work, spring rigging, brake rigging, valves, cylinders and pistons, and tire turning.
- (2) The boiler shop platoon of the boiler and smith shop company performs the removal and reinstallation of flues, and makes repairs to the fire box, ashpan, boiler jacket, and the pipe work. The smith shop platoon performs the forging and welding work. Tender tank repairs and carpentry work are performed by the boiler shop platoon.

215. Operational Scheduling in Car Shops

a. Normally, when entering a theater of operations, a backlog of bad-order cars is found—the result of war damage and deferred maintenance.

b. At the beginning of operations an advantage can usually be gained by setting up a program which schedules cars of identical types, both freight and passenger, through the shop at the same time. This tends to standardize operations where fewer types of parts are required.

c. When assembling new equipment, it is desirable to set up a production line and to schedule the work from station to station (called "spots"), moving the cars along the line rather than moving the workers, tools and parts.

d. In general, the demand for freight cars in a theater is heavy enough to preclude the necessity of setting up a preventive maintenance program. If such a program is feasible and civilian railroad records are available an advantage may be gained in production by investigating their particular shop programs during peacetime.

CHAPTER 19

TRANSPORTATION RAILWAY SHOP BATTALION (TYPE B)

216. Assignment

The type B shop battalion is normally assigned to a transportation railway group or it may be assigned directly to a railway command headquarters in a theater of operations.

217. Capabilities

When the type B battalion is manned by the required number of efficient, local civilians with rail experience, its capabilities are substantially the same as those of the battalion described in Part II of this manual.

218. Organization

a. The type B unit is organized with the minimum number of United States military personnel necessary for controlling and supervising the civilian shop and railway employees. It also includes sufficient United States technical and maintenance personnel to carry out the mission of the unit.

b. The type B unit is not organized under a rigid table of organization. Modification of the unit's composition is authorized to meet the local

conditions. Sufficient equipment for normal operation is provided. When local, rail-owned equipment is available, a full complement of TOE equipment will not be needed.

c. As with the operating battalion, the number of military personnel in the shop battalion may be modified by major oversea commanders, or by continental United States Army commanders, to meet the needs of a given area.

d. The organic units of the type B battalion are headquarters and headquarters company, erecting and machine shop company, boiler and smith shop company, car repair company, and diesel-electric locomotive repair company. For operations in which only steam locomotives are to be used, the battalion is activated without the diesel-electric locomotive company.

e. The number of jobs which must be filled by local civilians can be determined by comparing the type B column with the full and/or reduced-strength columns in the appropriate TOE. This number will depend upon the productive effort of the personnel employed, the number of shifts the unit works, and other local conditions of climate. The major oversea commander or the continental United States Army commander determines the number of personnel required.

219. Management

In any operation, proper control and supervision include consideration being given to the work methods and system formerly used by the rail employees during peacetime, who often will

not understand United States methods. A simple and reliable method for conveying orders and instructions should be devised, and battalion objectives should be clearly explained. With non-United States personnel, detailed standing operating procedures must be established.

PART FOUR

SUPPLY, DEFENSE, AND TRAINING

CHAPTER 20

SUPPLY

Section 1. ORGANIZATIONAL SUPPLY

220. General

The material presented in this part of the manual will, for the most part, be applicable to both the operating and shop battalion. Occasional statements may apply to only one of the battalions in which instance the specific battalion will be designated.

221. Responsibility

a. The transportation battalion commanders are responsible for the initial supply and the replenishment of all classes of supply in their battalion. Estimates or requisitions for supplies are forwarded sufficiently in advance to enable the next higher supply echelon to meet the battalion requirements. The battalion commanders are responsible for distribution within the battalions.

b. The commanders use their battalion supply officers to assist with supply and related matters.

The supply officers also function as division storekeepers and fuel agents. They are in direct charge of the operations of the supply and transportation section of headquarters company. They maintain the supply of food, clothing, ammunition, petroleum and petroleum products, and equipment and coordinate the railway supplies of the railway division.

222. Procurement and Distribution

a. Requests for supplies are submitted by company commanders to the battalion supply officers who consolidate the requests and forward them to the appropriate supply installations. Companies and detachments not located in the immediate vicinity of battalion headquarters may, by special arrangement, procure class I and III supplies from supply installations in that vicinity. Such arrangements will have prior approval of the battalion commander. Further details on procurement are discussed in paragraphs 227 through 234.

b. The supply and transportation section of headquarters company service platoon will receive, store, and distribute supplies for the battalion. Railway trains may be utilized for shipping supplies to outlying companies and detachments.

223. Class I Supply

a. Class I supplies consist of those articles which are consumed by personnel and animals at an approximately uniform rate regardless of local

changes in combat or terrain conditions. Rations and water are the principal items of class I supply.

b. Companies of the battalions submit daily strength reports to the battalion. The battalion supply officers forward the strength reports to the class I depot serving their battalions. Ration issue is automatic, based on the strength report. Informal requests may be submitted whenever special situations occur which make it desirable to change the number or type of ration.

c. Whenever possible, small outlying detachments should be attached for rations to another nearby unit that has kitchen facilities. In cases where there are no nearby units or class I depots, outlying detachments can be supplied with rations by regularly scheduled ration cars or ration trains. Outlying companies and detachments submit daily strength reports directly to the class I depot serving the companies and detachments.

224. Class II and IV Supply

a. Class II supplies are those articles for which allowances are established by tables of organization and equipment. Typical class II items are individual clothing and equipment, weapons, vehicles, and tools.

b. Class IV supplies are those articles for which allowances are not prescribed by tables of organization and equipment and the requirement for which is related directly to the operations contemplated or in progress. Typical class IV

items are special arctic clothing, rails, cross ties, and pole line material.

c. Procedures for supply of both class II and IV items are the same, except that class IV supplies may be restricted to those items approved by higher commanders. Companies send informal requests to the supply officers for preparation of consolidated requisitions and procurement of items from the appropriate supply depot.

225. Class III Supply

a. Class III supplies consist primarily of gasoline, fuel oils, lubricating oils, and grease. Procurement of class III supplies for railway operation will be discussed in section II of this chapter.

b. Resupply of gasoline may be obtained directly from the class III supply point by exchange of empty containers for filled containers or by direct filling to the vehicle tanks. Resupply of oil and grease may be made by the same methods, or they may be issued in cans.

226. Class V Supply

a. Class V supplies include ammunition, demolition materials, and chemicals. Typical class V items are small arms ammunition, antitank mines, explosives such as TNT blocks, fuses and detonators, and pyrotechnics and chemical munitions.

b. The battalions begin operations with a basic load of ammunition. It is a fixed amount established by the Department of the Army. Companies maintain a continuous supply of ammunition by replenishing their basic loads.

c. Companies send informal requests to the battalion supply officers for preparation of a request for ammunition and other class V supply items and procurement from the class V depot serving the battalions.

Section II. RAILWAY SUPPLY

227. General

a. Railway supplies, as distinguished from organizational supplies, are supplies required for the operation and maintenance of railway divisions. Typical railway supplies are rail, fastenings, switches, cross ties, coal, fuel oil and bunker "C" oil for locomotives, car and locomotive spare parts, brake shoes, journal brasses, air and steam hose, packing, greases, and lubricants.

b. Railway cars are not assigned to any railway operating battalion or railway group but are moved freely over the entire system as required. Locomotives are normally assigned to a railway group for use over the entire line. However, the railway group usually allots locomotives to the railway divisions in accordance with requirements. The railway group may transfer locomotives among its railway divisions to meet peak loads and other emergency demands. Wreck cranes are normally assigned to a railway group. The group allots the wreck cranes to the railway divisions, specifying at which terminals the cranes will be stationed.

228. Procurement

In a theater of operations, railway supplies may be procured from the sources given below. (When-

ever possible, local sources of supply should be exploited in order to ease the demand on transportation from the continental United States.)

a. Military stocks available in the theater, which are normally replenished from commercial sources in the zone of interior.

b. Manufacturing or producing firms in foreign countries which may be near or in the theater of operations.

c. Local civilian and foreign railway stocks and railway supply channels.

d. Captured enemy material and equipment.

e. Parts and assemblies manufactured or repaired by the railway shop battalion.

f. Transfers from other railway operating battalions.

229. General Requisitioning Procedure

a. The normal procedure for the requisition of a transportation item of supply is as follows: the company commander submits a request to the battalion supply officer. The battalion supply officer consolidates requests, where necessary, prepares a formal requisition, and forwards it to the railway group supply officer. The supply officer of the railway group determines if there is an excess of the item or items requested in one of the other units assigned to the railway group. If an excess is found, the transfer will be made from one battalion to the other. However, if no excess of the item or items is available, he processes the requisition and forwards it to the assistant general manager, supply (G4). The assistant general manager, supply, may then di-

rect the transfer of the requisitioned supply from one railway group to another. If the items are not found in excess of current requirements in another railway group, he passes the requisition to the transportation base depot company for issue. If no depot company is assigned to the railway service, the requisition is forwarded to the proper supply agency.

b. In cases where the railway group is the highest echelon of the military railway service in the theater, the supply officer of the railway group discharges the responsibilities of the assistant general manager, supply.

c. In cases where the railway operating battalion is not operating as a part of a railway group, the battalion supply officer is authorized to handle supply matters directly with the supply agencies.

230. Obtaining Supplies From Military Sources

a. *Supplies From Military Stocks.* Company commanders submit requests to the battalion supply officer. The battalion supply officer prepares formal requisitions and forwards them to the railway group supply officer. The highest military railway service headquarters in the theater may authorize the battalion supply officer to requisition certain transportation items of routine supply directly from the Transportation Corps base depot company without the approval of the next higher echelon. Items in short supply may be controlled as necessary, depending on the stock level in the depot. The battalion supply officer also

may be permitted, by the same headquarters, to requisition routine supplies from supply services other than Transportation Corps directly from the depots concerned.

b. Parts and Assemblies Manufactured or Repaired by the Railway Shop Battalion. Company commanders submit informal requests or work orders to the battalion supply officer. The railway group may authorize the battalion supply officer to deal directly with the railway shop battalion.

c. Transfers From Other Railway Operating Battalions. Company commanders submit requests to the battalion supply officer. He forwards the requests to the railway group supply officer or, if required, prepares formal requisitions and forwards them to the railway group.

231. Obtaining Supplies From Other Sources

a. Supplies Purchased From Foreign Civilian Sources. Company commanders submit requests to the battalion supply officer. He prepares purchase orders or requisitions in accordance with the policy established in the particular theater. Normally, the purchase orders or requisitions are forwarded to the railway group supply officer for further action. However, the railway operating battalion commander may be delegated the authority to approve purchase orders and requisitions for certain quantities of particular supplies. In such cases, the battalion procures the supplies locally and sends information copies of the transaction to the railway group supply officer.

b. Supplies From Local Civilian or Foreign Railway Stocks or Through Civilian Railway Supply Channels. All supplies obtained from this source, including those on hand at the beginning of operations, are reported currently by company commanders to the battalion supply officers. They forward the information to the railway group supply officer. It is essential that accurate records be maintained of all such transactions in order to protect the United States Government from fraudulent claims.

c. Captured Enemy Material and Equipment. All captured enemy material and equipment must be recorded and accounted for. In order that these supplies may be properly recorded and distributed, company commanders report all supplies obtained from this source to the battalion supply officer who forwards the information to the railway group supply officer.

232. Railway Fuel and Lubricants

Allotments of coal and other fuels for locomotives are normally made by a control board in the continental United States for each theater of operations conducting large scale operations. This item of supply is of such importance, and usually of such volume, that it receives special attention and handling. The fuel agents, assigned to each supply section in the various military railway service echelons of command, are responsible for seeing that the operating agencies of the transportation railway service actually receive sufficient locomotive fuels regardless of source. The

battalion supply officer serves as fuel agent for the railway operating battalion. Requisitions for fuel and lubricants are made through normal supply channels.

233. Stocking and Stock Levels

a. The preparation of tables of allowances and tables of supplies for units within the transportation railway service is the function of the supply officer in the highest railway service echelon of command. These tables must be prepared with an appreciation of operation in general and on the basis of requirements of specific operations by each division of railroad. A workable stock level allowance must be determined for each unit to insure uninterrupted operations at all times.

b. Supervision must be exercised by the battalion supply officer to insure that the required stock levels are maintained. Normally stock levels for the railway division are determined from past requirements. However, due consideration must be given to points where interruptions to rail traffic may occur because of enemy action or natural causes such as slides or washouts.

c. The battalion supply officer also must insure that supplies are distributed properly throughout his railway division. Particular attention will be paid to the prevention of hoarding or accumulation of excessive stocks at points along the line. Whenever such conditions are found, the supplies will be distributed to other division points where needed, or returned to the railway group.

234. Transportation Base Depot Companies

a. The basic organization for supply in the Transportation Corps is the transportation base depot company. Its mission is to provide for the receipt, storage, and issue of all Transportation Corps items of supply and equipment. Since the supervisory echelons of the transportation railway service do not stock stores or supplies, one or more transportation base depot companies may be assigned to the transportation railway group or transportation railway command of the railway service in the theater.

b. When a transportation base depot company is assigned to the transportation railway service, the supply officer of the transportation railway group or command will exercise full control over the stores and supplies in the depot. He will process and approve requisitions and will be responsible for the maintenance of supply levels by the depot company. The supply officer of the transportation railway group or command may authorize the supply officers in the lower echelons of the transportation railway service to requisition certain items of routine supply directly from the depot company without the approval of the next higher headquarters.

CHAPTER 21

CARGO SECURITY

235. General

a. Security is a function of all levels of command. It is more applicable to the operating battalion than the shop battalion because of the nature of their respective operations. The protection or safeguarding of Government property is the duty of every officer and enlisted man in the military establishment. Physical security of supplies can be achieved only if all military personnel are well disciplined in all phases of movement and protection of supplies. They must be made to realize that a few minor losses in rear echelons may contribute to a major catastrophe at the front lines.

b. The operating elements of the transportation railway operating battalion coordinate action with the loading agencies, unloading agencies, field transportation officers, and security agencies to effect prompt and safe movement of railway cars and lading.

236. Security at Origin

a. The consignor, or shipper, is responsible for the security of carload freight until the car is coupled to an engine or train for movement. Rail-

way operating battalion personnel should insure that shippers are fully aware of their responsibility.

b. Before loading a car, the shipper thoroughly inspects the car to see that it meets security requirements. Cars which have holes or damaged places in the floors, roofs, or sides, or insecure doors, are usually not suitable and should be repaired before use.

c. The shipper is responsible for properly loading and bracing the lading and closing and sealing the car. Improperly stowed or braced loads may be damaged by train movements; they also invite pilferage. Loading should conform to the standard necessary for safe movement under existing operating conditions. In sealing closed cars, the best protection is provided by tightly twisting 10-inch lengths of heavy-gage wire through locking eyes and snubbing wire ends off closely. Number 8- or 10-gage wire is usually used for this purpose. Zero-gage wire may be necessary in situations where the pilferage or sabotage threat is acute. Numbered seals add no further protection, but may indicate tampering. Securely fastened tarpaulins are used to cover shipments in open top cars. Small items being shipped on flatcars are securely fastened to the car floor.

d. An essential element in effecting adequate security for railway shipments is the use of proper documentation and movement orders. The shipper prepares an accurate list of contents, prepares the waybills, and affixes placards to the cars. The field transportation officer issues movement

authorization. These records are necessary to prevent not only the loss of the shipment but also the loss of the car en route. After a car is properly loaded, sealed, and documented, it is moved as quickly as possible.

e. Open top cars are inspected by the railway operating battalion before movement to see that they are properly loaded and that they meet clearance requirements.

237. Security During Transit

a. The transportation railway service is responsible for the security of all carload freight in transit from the time the car is coupled for movement until it is placed at the designated spot for unloading. The railway service prepares such car records, train documents, and other records as are required to effect prompt movement and to prevent loss of cars en route. When operating conditions permit, cars containing freight subject to pilferage are grouped to permit economy in the use of guard personnel. Special handling is given mail or high priority traffic of a classified nature.

b. Train guards are provided from military police or other units assigned or attached to the transportation railway service for security purposes. These units also guard cars and trains, in the process of movement in rail yards, for which the military railway service is responsible. These units may be supplemented by the use of civilian personnel, although such practice should be avoided if at all possible. When conditions warrant, sensitive supplies may be guarded by mili-

tary personnel specially assigned to the car by the loading agency. Railway service personnel effect coordination with the guard units for trains and mobile traffic within rail terminals. Yardmasters advise the train dispatcher on receipt of cars protected by special guards. They note the receipt on the train consist transmitted to yards and terminals to insure necessary action by all concerned to avoid delay in transit and to expedite placement at destination.

c. Guard crews check car seals and search for cars that are loaded in a manner which makes pilferage easy. They prepare and maintain a record, by car number, of all guarded cars in trains and record any deficiencies noted or events that occur en route. They secure the signatures of the relief guard crews on this record after a joint inspection has been made. They take action and render reports as required through their unit headquarters to the military railway service.

d. When a bad-order car containing supplies subject to pilferage is set out, a member of the guard crew remains with the car until properly relieved. Guard crews must be alert at all times, particularly when the train has stopped and when passing through tunnels, cuts, and native villages at slow speed.

238. Security at Destination

The consignee becomes responsible for carload freight when the car is placed at his depot or siding or on a track designated by him. Cars are unloaded as quickly as possible after arrival to

lessen the chances for pilferage. Care should be taken in removing wire seals from closed cars to avoid breaking car door latches. Wire cutters are recommended for this purpose.

CHAPTER 22

DEFENSE

239. General

a. Overall security of static installations, such as tunnels, bridges, yards, rail lines, and shop areas, against enemy air or ground attack and sabotage is the responsibility of the area commander. He effects this security with the means that are available to him for that purpose, such as military police, antiaircraft artillery units, mobile combat troops, and local service troops. The transportation railway operating battalion cooperates through proper channels with security agencies designated by area commanders, insofar as its primary mission permits.

b. The railway battalion commanders prepare a defense plan for the division. This plan is coordinated with the area commander and becomes a part of the overall area defense plan. The battalion defense plan includes the following as secondary missions for the companies of the battalion:

- (1) *Headquarters and headquarters company.* Assists in defense of battalion headquarters and/or the terminal area.
- (2) *Railway engineering company.* Assists

in defense of bridges, tunnels, and strategic points along the rail line.

- (3) *Railway equipment company*. Assists in defense of shops, yards, and other facilities in terminals.
- (4) *Train operating company*. Assists in defense of the train which they are operating.

c. The objective of a defense plan is to prevent or minimize enemy interference with operations. Such interference may come in the form of guerilla attacks, sabotage, air attacks, airborne attacks, infiltration, or a combination thereof. These forms of interference are discussed in paragraphs 240 through 247.

240. Guerilla Operations

a. Guerilla operations are predominately of a military nature and are characterized by the extensive use of unorthodox tactics conducted by irregular forces. The guerilla's most potent weapon is surprise. Personnel of the battalion, especially train crews and those located at outlying points, such as small stations, yards, and enginehouses, and maintenance of way detachments on line of road, must be alert at all times to the possibility of attack. Weapons and ammunition must be closely guarded and readily available for immediate use at any time.

b. The type of defense employed varies; it depends greatly on the local situation, proximity of other troops, and/or civilian police. Defense measures will be taken, such as construction of fortifications and trenches (FM 5-15).

c. In the event of an attack on a train, it may be possible for the train to continue in the same direction or, if the concentration of guerillas is far enough ahead of the train and the attack is observed in time, it may be possible for the train to stop and back up to the station in the rear. The objective is to save personnel and equipment. The action to be taken depends upon the local situation and the standing instructions of the battalion. In areas where guerilla attacks are experienced or anticipated, the positive or absolute block method of train operation should be used.

d. On passenger trains, all vestibule doors on cars should be kept closed at all times to keep guerillas from boarding. Heavy screen meshed wire should be securely fastened over all car windows to prevent guerillas from throwing hand grenades into the cars. Passenger trains should carry a supply of ammunition and hand grenades for the crew and passengers in case of attack. They should also carry fire extinguishers and first aid kits.

e. Guerilla operations against rail lines and installations may be attempts to effect one or more of the following. (Guerilla forces may employ several means to accomplish these results, among which the use of fire and explosives is most common.)

- (1) Destroy bridges.
- (2) Destroy rail lines (cause derailments).
- (3) Destroy terminals and yards.
- (4) Destroy equipment.

- (5) Destroy communications.
- (6) Obtain supplies.
- (7) Lower morale.
- (8) Harass personnel.
- (9) Capture personnel and/or inflict casualties.
- (10) Obtain weapons and ammunition. (Weapons and ammunition are especially critical. They must be either in the possession of using personnel or properly secured in a location under constant military surveillance.)

241. Sabotage

Sabotage is any willful act which destroys, impedes, or interrupts the function of any person or thing, committed with the intent of aiding the enemy. Constant vigilance is necessary on the part of all personnel to prevent or minimize sabotage. Any suspected sabotage must be reported immediately. The effects of sabotage may be the same as those of guerilla operations, but the two are separate in that sabotage is not a forceful effort and is accomplished in a secret manner. Saboteurs have a wide variety of ways or means with which to accomplish their mission. Some of these are using explosives or fire to destroy equipment, using chemicals to produce adverse effects on equipment, tampering with machinery, or making use of natural hazards.

242. Air Attacks

Air attacks may come at any time or place in a theater of operations. They may include bombing,

strafing, napalm, and/or chemical attacks. Camouflage is one of the best defenses against air attack. Rear area installations, stations, terminals, and billeting areas are adaptable to camouflage techniques. (See FM 5-20 for detailed information on camouflage.) Shelters for personnel protection should be constructed in these areas as soon as possible and all personnel informed of their locations. Moving trains may be attacked by enemy air forces. There are several defenses that can be used to protect a moving train, such as pulling the train into a tunnel or continuing to move forward at a higher rate of speed. Detailed information on action to be taken in event of air attack will be found in the transportation railway service standing operating procedure for the theater.

243. Airborne Attacks

Airborne attacks are carried out by dropping personnel and equipment from the air into a designated area for combat. Such personnel are better organized and equipped than guerilla forces, although the mission is essentially the same. Like that of guerilla forces, their most potent weapon is surprise. The principles of defense against guerilla attacks generally apply to airborne attacks.

244. Infiltrators

Infiltrators are enemy personnel who penetrate friendly lines. After the infiltrator has passed through friendly lines, he usually becomes a part of a guerilla band or a saboteur. The principles

of defense against guerillas and saboteurs are applicable in combating infiltrators. Battalion personnel should be alert at all times to apprehend any one loitering or acting in a suspicious manner near railroad facilities.

245. Rear Area Defense

Rear area defense is a combination of the defense outlined in paragraphs 240 through 244. The rear area constitutes the locations of units or installations behind the combat lines in the theater of operations. FM 5-200 should be consulted for information on camouflage of rear areas. Adequate local field fortifications will be constructed in accordance with FM 5-15.

246. Chemical, Biological, and Radiological Defense

a. General. The employment of chemical, biological, and radiological (CBR) warfare by a potential enemy is an ever-present possibility. Standard and especially adapted weapons are employed in this type of warfare, capable of inflicting large numbers of casualties on personnel and of restricting the use of areas and materiel. Each commander is charged with the responsibility for establishing and maintaining his unit's state of readiness against such attacks and minimizing their effects upon the accomplishment of his mission. The commander should send selected unit personnel to CBR schools so that they, in turn, may train other personnel in the unit in all phases of CBR defense. The medical service is responsible for proper instructions in first aid procedures.

b. Chemical Defense. Chemical warfare is

waged with chemical agents, substances which (through their chemical properties) produce lethal, injurious, or irritant effects; a screening smoke; or an incendiary action. Defense against chemical attacks is the application of necessary measures by an individual or unit for protection against the use of chemical agents. The transportation railway operating battalion will normally employ passive defense measures against chemical attacks. They include wearing gas masks, protective clothing, and other protective equipment; use of gasproof shelters; personnel decontamination; and first aid. For detailed information on defense against chemical attacks, see FM 21-40.

c. Biological Defense. Biological warfare is the deliberate use in war of living organisms or their poisonous products to produce death or disease in susceptible man, animal, or plants. Biological warfare agents may be disseminated overtly, such as in rocket and bomb fillings, or airplane spray; or the agents may be spread overtly, such as by sabotage, use of insect carriers, or free balloons. All military personnel must be alert to detect evidence of actual use of biological agents, especially in case of covert attacks which might otherwise go unnoticed. (See FM 21-40 and FM 21-41.) Means are provided for the detection and identification of biological agents through the use of trained personnel who collect and sample materials of known or suspected contamination. Identification of biological agents is the responsibility of the Army Medical Service. Samples are sent expeditiously through technical channels to desig-

nated medical laboratories, and word of the attack is rapidly spread through command channels. The transportation railway battalions will normally employ passive defense measures against biological attack. These will include use of protective masks, development of a high state of cleanliness and health among personnel, preventive medicine as prescribed by the medical service, and decontamination.

d. Radiological Defense. Radioactive substances, which can produce casualties by emission of radiation, may be disseminated as aerosols, dusts, or larger particles. Two of the three types of radiation, alpha and beta, present an internal hazard only, and the protective mask is the only protection required. The third type of radiation, gamma, presents an external hazard but is easily detected by instruments. Protection consists of seeking cover (ditches, culverts, etc.) or avoiding contaminated areas.

e. Atomic and Thermonuclear Weapon Defense. Atomic and thermonuclear weapons produce casualties by means of three effects: heat, blast, and radioactivity. The heat and blast effects of these weapons account for the great majority of the total casualties inflicted. Protection against these consists of taking available cover. (See FM 21-40 and FM 21-41.) This procedure also affords protection against radiation effects. The transportation railway battalions will employ passive defense measures against atomic or thermonuclear attack, the most important of which is dispersion of personnel and equipment.

247. Area Damage Control

a. The area commander is responsible for preparation of an area damage control plan, which is a plan to aid in the reestablishment of logistical support by minimizing the effects of enemy action or natural disaster. The area commander is responsible for the coordination of all resources in his area in order to effect the area damage control plan. The plan will include the following principal requirements:

- (1) Protective measures (organization and control, training, and dissemination of warnings).
- (2) Rescue and medical treatment (first aid, evacuation, and hospitalization).
- (3) Reestablishment of normal operations (control of damage, salvage of material, monitoring and detecting contamination, decontamination, and recommendations on the reorganization of support).

b. The railway battalions will be responsible for the following:

- (1) Preparing a unit area damage control plan coordinated with the section plan.
- (2) Placing the unit plan in effect when local conditions require.
- (3) Having each company where possible, organize, equip, and train a light rescue squad to be available at all times.
- (4) Having each company where possible, organize, equip, and train an emergency decontamination squad to be available at all times.

- (5) Being prepared to initiate chemical, biological, and radiological surveys, mark off areas, and report findings.
- (6) Continuing its normal support mission.

CHAPTER 23

TRAINING

248. General

a. Modern warfare exposes all units to potential combat. Geographical location provides no guarantee of security. Thus it is imperative that the transportation railway battalions be capable of defensive combat and of providing for the security of troops and installations. At the same time, the battalions must be capable of performing their technical mission.

b. Unit commanders are responsible for the training of personnel in their units. Training will include individual and unit training in both military and technical fields.

c. Training must be a continuous, comprehensive effort. Its aim is to produce a smooth-running organization capable of sustained operations under varying conditions with maximum speed and efficiency. To this end all individuals must be trained as both soldiers and technicians.

d. Coordination of training is achieved with a standard training cycle. In this cycle, men advance successively through four phases of training, regardless of their MOS or the type of unit to which they belong. The sequence of the phases

of training is given in paragraph 249. This paragraph will be used as a guide only and will not supersede training directives or programs issued by higher authority.

249. Phases of Training

a. Basic Combat Training. During this phase, which is his first training, the soldier is taught the fundamentals of infantry combat, including squad tactics. He also receives instruction in military skills common to all arms and services, such as first aid, field sanitation, and close order drill.

b. Advance Individual Training. During this phase, the soldier trains for his military occupational specialty (MOS), such as clerk, cook, train dispatcher, section hand, locomotive fireman, or locomotive mechanic. Whenever service schools are available for MOS training, they should be utilized. Here the MOS training may exceed the standard 8 weeks allowed for most MOS training. Civilian railroads are also often utilized during this period.

c. Basic Unit Training. During this phase, trained individuals are formed into effective teams such as train crews, section crews, and shop teams. The men learn to work smoothly together. The teams learn to operate as components of platoons. Platoons, in turn, learn to work together as companies. A smooth-working company-size team is the end product of basic unit training.

d. Advanced Unit Training. During this phase the company teams are welded into a battalion team. This period is ideally spent with the rail-

way battalions operating a part of a railroad. However, because of lack of facilities, it may be necessary for each company of the battalion to train separately.

250. Post Cycle Training

Training does not stop with completion of the phases of the standard training cycle. Post cycle training consists of the following:

a. Refresher Training. The main purpose of refresher training is to correct deficiencies found during or after completion of the standard training cycle. For example, while on a field exercise a unit may show that it is not prepared for a gas attack—or is slow in meeting it. As soon as possible after the field exercise is over, this unit normally will take refresher training in defense against chemical warfare.

b. Cadre Training. The cadre for a new railway operating battalion is taken from one that has already completed the standard training cycle. Since cadre men teach the battalion's new men, these cadre men must be given refresher courses in the subjects they are to teach. This training is normally an abbreviated version of portions of the standard basic and advanced individual training programs. The material, however, is presented much more rapidly and the standards or proficiency naturally are higher.

c. Training for Special Operations. This training, insofar as it concerns the railway operating battalion, consists mostly of additional training

for extremely hot or extremely cold climate operations.

251. Training Records and Reports

Each company of the battalion will maintain progress records and will submit training reports to battalion headquarters. Training records maintained by the battalion may be unit reports of training accomplished or consolidations of these records over predetermined periods.

CHAPTER 24

MISCELLANEOUS SERVICES AND FUNCTIONS

252. Medical Service

Normally the transportation railway battalions will receive medical service from local medical units and installations. Where medical service is not available locally, it is normal procedure to attach a medical detachment (TOE 8-500) when authorized.

253. Intelligence

a. General. The battalion commander is responsible for the collection of transportation intelligence information within the battalion (FM 30-16). Having no organic intelligence section, he should assign definite intelligence functions to the best qualified personnel available.

b. Essential Elements of Information. Personnel of the battalion must be trained to be alert for information about rail installations, supplies, facilities, and trained rail personnel which can be used by our forces. Essential elements of information relative to equipment, installations, and supplies will include data as to the type, quantity, condition, and capacity of each item. In many cases, additional information such as gage, type of fuel, type of traction, speed, gross weight, and

vertical and horizontal clearance is needed to permit intelligent planning for the use of the equipment. When spare parts are involved, exact nomenclature is required to prevent confusion.

c. Sources of Information. Following is a list of sources of transportation information :

- (1) Documents, such as maps, blueprints, technical studies and reports, timetables, schedules, operating rules, and engineering data.
- (2) Photographs, aerial and other.
- (3) Personal observation and contacts.
- (4) Equipment and nameplates.
- (5) Friendly foreign nationals and native sympathizers.
- (6) Railway reconnaissance teams.

d. Channels. Transportation information desired will be requested from the railway group. Transportation information obtained in the field by the battalions will be forwarded to the railway group or next higher organization. Captured enemy materiel will be safeguarded and reported. Evacuation instructions will come down through railway when evacuation is indicated.

e. Transportation Corps Technical Intelligence Teams. The battalion commander will insure that personnel of his battalion cooperate fully with Transportation Corps technical intelligence teams whose duties are as follows :

- (1) To collect and evaluate enemy material and equipment.

- (2) To instruct troops in the handling, use, and maintenance of captured materiel.
- (3) To locate, evaluate, and exploit enemy installations.
- (4) To question and examine enemy production experts.
- (5) To select captured enemy equipment and expedite its flow for intelligence purposes.

254. Counterintelligence

a. The objective of counterintelligence is to reduce or destroy, if possible, the effectiveness of enemy intelligence. Battalion commanders are responsible for counterintelligence and this responsibility cannot be delegated. Provisions of AR 380-5 will be followed in safeguarding transportation intelligence.

b. Counterintelligence activities and functions within the battalions normally include secrecy discipline; concealment and camouflage; communications security; restrictions on the preparation, transmission, and use of documents; regulation of the activities of visitors; and censorship. Counterintelligence measures must be carefully prescribed and enforced.

c. Personnel must be trained to the constant observance of secrecy under all conditions. Military information such as instructions, plans, operations, movements, and the strength, composition, or location of units must never be discussed except in line of duty and then only with persons whose duties require such information.

255. Bivouac

a. General. Normally, railway troops will be located at a terminal, yard, or station where housing facilities exist. However, detachments, companies, and even battalions may be required to bivouac, at least temporarily. Each higher echelon will select the general location of the bivouac area for the next lower echelon. Before going into bivouac, the detachment, unit, or battalion will send an advance party to the area to select the exact site and to make administrative arrangements.

b. Selecting the Bivouac Area. In selecting a bivouac area the following factors should be carefully considered:

- (1) *Terrain.* High ground with good drainage is preferred. Hardstand for parking vehicles is desirable. Wooded areas should be selected when possible to provide natural concealment.
- (2) *Road network.* The unit should be bivouacked as close to its work as possible, yet consideration must be given to access to roads and the general road network.
- (3) *Sanitation.* High, dry ground and an accessible water supply are essential (FM 21-10).
- (4) *Security.* An area formerly occupied by the enemy must be carefully checked for booby traps and gas contamination. The area should be selected from the standpoint of permitting adequate security.

- (5) *Communications.* The area should be located near a telephone trunk line so that 24-hour contact can be maintained with the area.

c. *Security of the Bivouac Area.* The security of the bivouac area depends upon—

- (1) *Interior guard.* Each unit must provide its own personnel for the protection of the camp site and Government equipment.
- (2) *Individual security.* Means of individual protection include individual weapons, foxholes, and slit trenches.
- (3) *Security plan.* The security plan must provide for protection against enemy airborne attacks, guerilla action, sabotage, aerial and ground bombardment, aerial photography, and pilferage.

256. Movement Control

a. Field transportation officers are assigned at strategic locations in the field within the transportation net to act as representatives of the transportation officer of the command concerned. They coordinate the transportation activities of the shipping and receiving agencies and the transport services.

b. The field transportation officer's functions include assistance in implementing movement programs and acting as movement control officer in areas where personnel and supply movements originate and terminate, and where personnel and cargo may be diverted, reconsigned, or trans-

ferred. These officers are usually located at important rail shipping, intermediate, and receiving points. When so located their functions pertaining to rail movement include the following:

- (1) Furnishing advice on transportation matters to unit commanders and technical service field installations.
- (2) Receiving requests for cars and switching service from shipping and receiving agencies and relaying them to the railway operating battalion.
- (3) Notifying receiving agencies of the arrival of shipments.
- (4) Insuring that loading and unloading of rail cars are accomplished expeditiously.
- (5) Insuring that requirements for packing, marking, crating, and documentation by shipper are fulfilled.
- (6) Checking shipper's documentation for correctness and adequacy.
- (7) Insuring efficient utilization of rail cars.
- (8) Holding, diverting, and reconsigning personnel and supplies moving through the area.
- (9) Operating transfer points.
- (10) Operating consolidating facilities.
- (11) Operating in-transit storage facilities.
- (12) Issuing travel warrants.
- (13) Effecting yard checks of installations.

c. Field transportation officers have no control over the operation of trains, nor over personnel of the railway service. However, personnel of the

railway service will cooperate fully with field transportation officers and will not interfere with their traffic functions. Problems of common interest should be mutually coordinated and solved.

257. Transportation

a. Movement of the operating and shop battalions is by rail, and it is anticipated that organizational equipment will always be carried in rail cars. Special railway equipment and railway supplies do not accompany a railway operating battalion when moved, except under extraordinary circumstances.

b. Rail cars for movement of the battalions or any company of the battalions will be requested from the field transportation officer. It is not required that rail cars for inter- or intra-division movement of railway supplies be requested from the field transportation officer. Movement of railway supplies from ports or depots (excluding transportation base depot companies assigned to the railway service) will be handled through normal movement control channels.

c. Tables of equipment show the authorized allowances of motor transportation. Sufficient motor vehicles are provided to permit the administration and supply of units, to provide contact with higher authority and depots within the railway division, and for technical operation of the units.

258. Special Operations

a. General. Railway units can operate with equipment presently in use in extremely cold or

extremely hot regions in the same manner as in more temperate zones. General conditions encountered by troops in extremely hot or cold areas may be largely overcome by special training, conditioning, and a high degree of self-discipline.

b. Operations in Extremely Cold (Arctic) Regions (FM 31-70). Cold is not the worst factor in arctic operations. Very restrictive to operations are high winds, up to 60 miles per hour, and heavy snow, up to 15 feet deep in some areas. Of the two, wind is more restrictive since snow can be removed. Additional personnel will be required in the battalion since arctic operations require added maintenance, and personal efficiency decreases as temperatures lower. The following are some operational problems that will confront the battalion:

(1) *Headquarters and headquarters company (train movement).*

- (a) Because of drainage and maintenance problems, there will be few turntables. Wyes will be used.
- (b) Use of centralized traffic control is not feasible. Radio operation of trains is not dependable because of atmospheric disturbances.
- (c) Blocked tracks, washouts, and derailments will be frequent, requiring flexible train schedules.

(2) *Railway engineering company.*

- (a) Track must be inspected frequently.
- (b) Switches are often frozen.

- (c) Snow and rock slides, washouts, and frost heaving occur frequently.
 - (d) Ice caused by water seepage must be cleared from tunnels.
 - (e) Rail wears more quickly.
- (3) *Railway equipment company.*
- (a) Maintenance requirements are high on all equipment.
 - (b) Increased time is required for maintenance (five times longer at -50° than at $+40^{\circ}$).
 - (c) Covered and heated shops are required. (Radiant heat is preferable.)
- (4) *Train operating company.*
- (a) Additional personnel are needed for separate snow removal trains.
 - (b) Additional train crews are required. (Low temperature reduces locomotive tractive effort, resulting in fewer cars per train.)
 - (c) A close watch must be kept for snow and rock slides, washouts, and frost upheavals to prevent derailment.
 - (d) Trains must carry emergency equipment such as snowshoes and blankets.
- (5) *Modifications to diesel locomotives.* In general, diesel locomotives are more satisfactory than steam for use in arctic regions. The following modifications or practices will increase the working time of diesel locomotives:
- (a) Using special greases and oils.

- (b) Sealing journal boxes to reduce maintenance by keeping out snow.
 - (c) Installing snowplow equipment.
 - (d) Installing cooling system heaters.
 - (e) Installing fuel line heaters.
 - (f) Using fully charged or specially processed batteries and keeping engines running to prevent freezing.
 - (g) Installing locomotive hoods.
 - (h) Adding a chemical compound to fuel to prevent freezing.
 - (i) Using double panes on windows.
- (6) *Modifications to steam locomotives.* The following modifications or practices will increase the working time of steam locomotives:
- (a) Using double panes on windows.
 - (b) Installing heating units for water tanks.
 - (c) Installing snow flangers.
 - (d) Thoroughly insulating and packing steam and water lines.
 - (e) Keeping engines fired up continuously.
- (7) *Modifications to railway cars.* The following practices and modifications will increase the availability of railway cars:
- (a) Painting all markings yellow (more easily seen through snow).
 - (b) Having train line defrosters available.
 - (c) Avoid leaving cars standing longer than absolutely necessary. (The jour-

nals may freeze, or the wheels may freeze to the rail.)

- (d) Installing pad lubricators in journal boxes.

c. Operations in Extremely Hot Regions. Most difficulties that hamper railway operations in hot regions stem from two sources—heat and sand. The following are some operational problems that will confront the battalion:

(1) *Railway engineering company.*

- (a) Cool nights and hot days will cause excessive buckling and kinking of track. The use of low carbon steel rails helps prevent this.
- (b) Flash floods cause washouts.
- (c) Because of the heat, track work may be limited to the period from early in the morning to noon.
- (d) Hardwood, concrete, or steel ties may be encountered.

(2) *Railway equipment company.*

- (a) Inadequacy of local water supply is often encountered. This can be corrected by running water trains.
- (b) Heat and sand shorten the life of motors by causing excessive wear which increases the need for spare parts.
- (c) The desert sand in the air will necessitate frequent cleaning of oil bath air filters to remove sand.

- (d) Extra windshields will be required to replace those damaged by sandstorms.
 - (e) The annual rainy season will necessitate thorough protective insulation of electrical parts.
- (3) *Train operating company.*
- (a) When both steam and diesel locomotives are available, diesels should be used for daytime runs and, if such a condition exists, for the hotter part of the division.
 - (b) When multiple diesels are used, they should be operated cab-to-cab to enable the rear diesel to get the maximum amount of fresh air.

259. Evacuation

a. Supplies. During retrograde operations, timely evacuation of endangered supplies must be accomplished to preserve essential supplies, to deny their use to the enemy, to permit the timely release of transportation facilities for the rearward movement of troops, and to minimize confusion during retrograde movements. Temporary supply points may be established along the route of withdrawal. Priorities of supplies to be evacuated and destinations will be determined by higher headquarters. Railway supplies to be evacuated will be reported to the railway group, and movement instructions will be forwarded to the battalion through movement control channels. The railway operating battalion will cooperate to the utmost in implementing the withdrawal movement

plan. The situation at times may require holding excess locomotives in the forward area, crewed and available for evacuation movements.

b. Medical. Evacuation of medical patients from one medical installation to another in a theater of operations will be by ambulance train whenever possible. Ambulance trains may be operated as regularly scheduled trains or as extra passenger trains. Ambulance trains normally take priority over all other trains. Priorities may be adjusted by major commands to meet emergencies arising from combat operations.

APPENDIX

REFERENCES

1. Field Manuals

FM 5-15	Field Fortifications
FM 5-20	Camouflage, Basic Principles
FM 5-25	Explosives and Demolitions
FM 10-6	Quartermaster Service Company
FM 21-10	Military Sanitation
FM 30-16	Technical Intelligence
FM 31-70	Basic Cold Weather Manual
FM 100-10	Field and Service Regulations— Administration
FM 101-5	Staff Officers Field Manual
FM 101-10	Staff Officers Manual—Organiza- tion Technical and Logistical Data

2. Technical Manuals

TM 5-370	Railroad Construction
TM 5-627	Railway Track Maintenance; Re- pairs and Utilities
TM 38-750	The Army Equipment Record Sys- tem and Procedures
TM 55-205	Railway Communications and Signals

3. Army Regulations

AR 55-650 Railroads

AR 105-15 Field Signal Communications

AR 380-5 Safeguarding Military Information

4. Tables of Organization and Equipment

TOE 55-217 Transportation Electric Power
Transmission Company

**TOE 55-225 Transportation Railway Operating
Batallion**

TOE 55-226 Headquarters and Headquarters
Company, Transportation Rail-
way Operating Battalion

TOE 55-227 Railway Engineering Company,
Transportation Railway Operat-
ing Battalion

TOE 55-228 Railway Equipment Company,
Transportation Railway Operat-
ing Battalion

TOE 55-229 Train Operating Company, Transportation Railway Operating Battalion

TOE 55-235. Transportation Railway Shop Battalion

TOE 55-236 Headquarters and Headquarters
Company, Transportation Rail-
way Shop Battalion

TOE 55-237 Transportation Erecting and Machine Shop Company

TOE 55-238 Transportation Boiler and Smith
Shop Company

TOE 55-239	Transportation Car Repair Company
TOE 55-247	Transportation Diesel-Electric Locomotive Repair Company
TOE 55-302	Headquarters and Headquarters Company, Transportation Railway Command
TOE 55-500	Transportation Service Organization

5. DA Forms

General

55-200	Clearance Form "A"
55-203	Train Order
55-205	Dispatchers' Record of Train Movements
55-206	Combined Register of Trains and Comparison of Watches
55-208	General Notice
55-209	Station Record of Train Movements and Operator's Transfer
55-210	Check of Train Register
55-211	Yardmaster's Call Report
55-212	Switch List
55-214	Superintendent's Telegraphic Report of Accidents
55-215	Transportation Corps, Transportation Railway Service; Instructions
55-216	Daily and Cumulative Report of Train Tonnage
55-220	Time Inspection Register

55-221	Time Record of Standard Clock
55-222	Set-Out Report
55-223	Conductor's Wheel Report
55-232	Mechanical Examination for Locomotive Engineer's Questionnaire
55-242	Daily Telegraph Car Report
55-243	Daily Statement of Cars on Hand
55-250	Request for Car Movement
55-253	Bridge Inspection Report
55-256	Telegraphic Report of Obstruction to Line
55-258	Report of Railway Material on Line
55-266	Battalion Fuel Situation

Inspection and Maintenance of Locomotives and Locomotive Cranes

2407	Maintenance Request
55-150	Ash Pan and Spark Arrester Inspection and Repair Record
55-151	Alternation Report for Steam Locomotives and Locomotive Crane Boilers
55-152	Boiler Specification Card for Steam Locomotives and Locomotive Cranes
55-202	Locomotive Equipment, Supply and Tool List
55-226	Daily Inspection Report, Locomotive and Locomotive Cranes
55-227	Monthly Inspection and Repair Report—Steam Locomotives and Locomotive Cranes

- 55-228 Annual Inspection Repair Report,
Steam Locomotives and Locomo-
tive Cranes
- 55-234 Daily Report of Terminal Blow-
down Operation

Inspection and Maintenance of Rolling Stock

- 2407 Maintenance Request
- 55-126 Request and Receipt for Spare
Parts, Supplies, Services, or Re-
pairs for U. S. Army Hospital
Cars from the Pullman Company
or Railroads
- 55-154 Record of Special Tests Made on
Air Brake Equipment
- 55-156 Battery Removal and Application
Record
- 55-158 Hospital Car Inspection and Re-
pair Record
- 55-160 Record of Cleaning Water Tanks
on Hospital and Kitchen Cars
- 55-161 Air Brake Defect Tag
- 55-162 Inspector's Record
- 55-163 Car Inspector's Train Report
- 55-164 Bad Order
- 55-165 Conductor's Report of Damaged or
Defective Cars
- 55-237 Rolling Stock Specification Record

Motor Pool and Motor Vehicle

- 285 Accident Report
- 2400 Equipment Utilization Record

2404	Equipment Inspection and Maintenance Work-Sheet
2408-1	Equipment Daily or Monthly Log
2407	Maintenance Request
2402	Exchange Tag

6. DD Forms

6	Report of Damaged or Improper Shipment
518	Accident-Identification Card
1333	Report of Cars Damaged
1334	AAR Defect Card

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[AG 853 (15 Oct 62)]

By Order of the Secretary of the Army:

Official:	EARLE G. WHEELER, <i>General, United States Army,</i> <i>Chief of Staff.</i>
	J. C. LAMBERT, <i>Major General, United States Army,</i> <i>The Adjutant General.</i>

Distribution:

Active Army:

DCSPER (2)
DCSLOG (2)
DCSOPS (2)
Ofc, Reserve Components (2)
TJAG (1)
TPMG (1)
OPO (2)
CofEngrs (1)
TSG (1)
CSigO (1)
CofT (5)
AMC, Det #1 (ORD) (5)
USA CD Agcy (2) except
Trans (5)
USCONARC (20)
Hq, Army Mat Comd (10)
Combat Dev Comd (20)
OS Maj Comd (5)
OS Base Comd (2)

LOGCOMD (5)
 ARADCOM (5)
 MDW (2)
 Armies (15)
 Corps (10)
 USA Corps (3)
 Div (5)
 Combat Svc & Spt Gp (5)
 Instl (1)
 USMA (5)
 Svc Colleges (5)
 Br Svc Sch (5) except
 USATSCH (100)
 PMS Sr Div Units (2)
 PMS Mil Sch Div Units (2)
 POE (2)
 USA Trans Tml Comd (10)
 Engr Dist (2)
 Units org under fol TOE:
 55-201 (10)
 55-202 (5)
 55-217 (5)
 55-225 (15)
 55-235 (10)
 55-302 (5)
 55-500 (Tms AA-AE) (2)

NG: State AG (3); units—same as active Army except allowance is one copy to each unit.

USAR: Same as active Army except allowance is one copy to each unit.

For explanation of abbreviations used, see AR 320-50.

3000021262

DAILY INSTALLATION SITUATION REPORT (FM 55-22)				TYPE OF CONVEYANCE <input type="checkbox"/> RAIL <input type="checkbox"/> BARGE <input type="checkbox"/> TRUCK		TO:		FROM: (Reporting Agency) Station Agent Chalons				24-HOUR PERIOD ENDING TIME 1800 DATE 24 Jan 1954										
INSTALLATION DESIGNATION AND LOCATION a	SERVICE AND CLASS b	ON HAND START PERIOD c	RECEIVED d	INBOUND				AWAIT-ING PLACEMENT				OUTBOUND				EMPTY		REMARKS w				
				UNLOADED		RECON-SIGNED h	ON HAND END PERIOD			ON HAND START PERIOD n	RECON-SIGNED o	LOAD-ED p	FORWARDED		ON HAND END PERIOD t	RE-QUIRED u	AVAIL-ABLE v					
				QUANTITY e	AUTH f		24 HR OR LESS i	OVER 24 HR j	OVER 48 HR k				TOTAL l	QUANTITY q					AUTH r	TONS s		
Q-640	QM-I	23	17	26	260	L-80	2	8	2	2	12	11	14	2	19	35	350	L-101 FR-1468	--	38	20	14 Cars QM I arrived late in day
Chalons	QM-II & IV	8	11	15	150	L-81	--	2	2	--	4	6	--	--	--	--	--	--	--	--	--	
	QM-III	16	--	16	160	L-82	--	--	--	--	--	--	12	--	31	40	400	L-103	3			
*Columns (c+d) - (e+h) = Column i **Column (n+o+p) - q = Column t				TYPED NAME, GRADE AND TITLE OF PERSON AUTHENTICATING REPORT John Jones, SFC										SIGNATURE <i>John Jones</i>								

DA FORM 1322
1 MAY 55

Figure 7. Daily Installation Situation Report (DA Form 1322).

INSTRUCTIONS

Note. The following instructions appear on back of DA Form 1822.

COLUMN a—In this column, enter the number of the installation, such as Q-640, which indicates a quarter-master depot, with the numerical designation 640. In addition, indicate the nearest city or town (*Chalons*).

COLUMN b—Enter here the class of supplies received or shipped from the installation; for example, a QM Class I depot would be shown as QM I. Each item should be placed on a separate line.

COLUMN c—Enter the number of conveyances, inbound, carried over from the previous day.

COLUMN d—In this column, enter the total number of inbound conveyances that have actually been moved into the installation area and spotted for unloading during the 24-hour period covered by the report.

COLUMNS e, f, g—Enter in column e the total number of inbound conveyances actually unloaded by the installation during the period. Do not include any that have been reconsigned. Enter in column f the amount of tonnage involved. In column g indicate the line number from the movement program or special release number if other than a movement program shipment.

COLUMN h—Enter the total number of inbound or on-hand cars or other transportation units reconsigned to a new destination during the period.

COLUMNS i, j, k, l—Enter the number of inbound loaded conveyances on hand in the installation at the end of the period. In column i indicate the number of loaded conveyances held for 24 hours or less. In column j indicate the number held over 24 hours but less than 48 hours. In column k indicate the number held over 48 hours. In column l indicate the total conveyances on hand at end of period (i+j+k). These figures are obtained by making a physical check of the installation.

COLUMN m—Enter conveyances still under the control of an operating service but waiting to be spotted for unloading.

COLUMN n—In this column, enter the number of conveyances loaded the day before but not shipped out.

COLUMN o—Enter here the number of conveyances which were reconsigned; that is, which were transferred from the inbound column to the outbound column. This figure is taken from the column headed reconsigned in the inbound section.

COLUMN p—Enter the total number of conveyances the installation has loaded during the 24-hour period. DO NOT include any reconsigned conveyances.

COLUMNS q, r, s—In column q enter the total number of outbound conveyances loaded by the installation, plus the total number of conveyances reconsigned by the installation which have been forwarded during the period covered by the report. In column r enter the amount of tonnage involved. In column s indicate the line number from the movement program, or special release number if other than a movement program shipment.

COLUMN t—Enter the accumulative total number of outbound conveyances loaded by the installation which are on hand waiting to be forwarded at the end of the period. Include conveyances which have been reconsigned to new destinations.

COLUMNS u, v—In column u, indicate the number of empty conveyances required by the installation for the next day's operation. In column v, enter the total number of empty conveyances made available for use of the installation, including all empties in the installation. Indicate types of empty conveyances required and available; for example, for rail cars show B for boxcar, F for regular flat car, HF for heavy duty flat car, LG for low side gondola, HG for high side gondola, R for refrigerator car, and T for tank car.

COLUMN w—In this column, enter any pertinent information concerning the operations such as description of special empty conveyances required or reasons for loaded conveyances being held over 24 and 48 hours.



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