

## CHAPTER 4

# LOGISTICS

*Another substantial undertaking was the construction and maintenance of several MSRs to support the movement of soldiers, equipment, fuel, food, water and ammunition. These MSRs were color coded Green, Blue, Black, and Gold. Over 68 miles of new MSRs were constructed, with maintenance required on over 204 miles. Operations were conducted around the clock with all of the company's assets. Continuous sustainment operations reduced the average life span of grader cutting edges to three days. Heavy dust one day and heavy rains the next provided added challenges every day.*

From the 131st Engineer CSE Company Unit History in Support of Operation Desert Shield/Storm, dated 10 March 1991, Christopher D. Bishop, Commanding.

Logistics is the process of planning and executing force sustainment in support of military operations. A force-projection Army depends on the right logistical decisions prior to the onset of operations. There is normally little time for last-minute logistics fires when the decision to employ combat forces has been made.

Corps engineer force sustainment is critical for maintaining and multiplying combat power. Logistical operations sustaining corps engineer activities accurately anticipate engineer needs. Many corps engineer logistical needs are unique, one-of-a-kind requirements that demand improvisation by the logistician and oftentimes strain the logistical system. Special

engineer equipment is of low density requiring intensive management to ensure availability for mission use. Engineer mission materials are normally bulky heavy and hard to transport. They must be requisitioned, transported, stockpiled, and issued in a streamlined manner. Engineers play a key role in supporting corps logistics operations, including the construction, upgrade, and maintenance of logistics bases, troop bed-down facilities, airfields, ports, and MSRs.

This chapter focuses on the sustainment of corps engineer units and corps engineer support to corps logistical operations. It supplements doctrine found in FMs 100-10 and 63-3.

### THE UNDERPINNINGS OF LOGISTICS

The objective of logistics is to ensure operations succeed and facilitate the commander's ability to generate and mass combat power at the decisive time and place. Logistics is a major

operating system. Strategic and operational logistics support wars, campaigns, and major operations; tactical logistics support battles and engagements. Corps logistics focuses on

operational and tactical support. Corps engineers closely support operational logistics in areas such as renovating existing facilities or, if required, constructing new troop bed-down facilities for force-reception operations; opening ports and airfields to develop the theater infrastructure; and assisting in the distribution and management of material, movements, and personnel and health services by constructing and maintaining MSRs and other logistics support facilities. Operational logistics support encompasses those activities required to sustain campaigns and major operations and to enable success at the tactical level of war.

Tactical logistics encompasses all CSS and engineer activities required to sustain the tactical commander's ability to fight battles and engagements. Successful tactical logistics pro-

vides the right support at the right time and place to units in the combat zone. Corps engineers receive tactical logistics support from COSCOM units in the areas of manning, arming, fueling, fixing, moving, and sustaining. Corps engineers support tactical logistics operations in areas such as constructing FARPs, digging in ASPS and corps logistics C2 nodes, and erecting fixed bridging along forward supply routes.

Regardless of the war level, the corps engineer logistical support structure and resource requirements are dependent upon METT-T. The corps engineer logistical support structure fully supports the corps commander's intent and is integrated into his concept of operation. Trade-offs between combat and general engineering capabilities in the corps area directly affect this logistical support capability.

## LOGISTICS CHARACTERISTICS

Scarce resources require logistics operations to be efficient, not wasteful. Logistics operations must be effective to provide the intended or expected support therefore, successful logistics support must be balanced between effectiveness and efficiency. Logistics operations are characterized by being able to anticipate requirements, integrate joint and multinational logistics support and improvise solutions and by being responsive and continuous. These characteristics facilitate effective, efficient logistics support and enable operational success. They apply in both war and OOTW. These imperatives act as a guide for planners and operators to synchronize logistics on the battlefield. The corps engineer unit commander and his staff understand and use these imperatives while planning engineer operations. The following paragraphs describe these characteristics along with corps engineer considerations for each:

### ANTICIPATION

To anticipate means that the corps logistics planner is proactive rather than reactive be-

fore, during, and after combat operations. Corps logistic planners look at least 72 hours into the future. Corps logisticians consider joint, multinational, and host-nation assets when planning support for engineer operations. They maximize the use of all available resources, especially host-nation assets. They prioritize critical logistical activities based on the concept of operations. They anticipate logistical requirements based on experience and historical knowledge. They concentrate on critical war-stoppers first, then move to the item next in priority. They participate in and evaluate the logistical significance of each phase of the operation during the entire command-estimate process, to include: mission analysis; course-of-action (COA) development, analysis, war gaming, and recommendation, and execution of the plan. Various phases of force-projection operations can help describe anticipation requirements for corps engineers.

### Predeployment and Deployment

If possible, before hostilities begin, the logistics organization first envisions and then becomes

capable of supporting engineer operations involved in theater sustaining base development. Since all corps logistics and combat operations depend on a robust infrastructure system, base development should be placed high on the force-projection theater commander's priority list. A foreign country's infrastructure cannot be developed overnight to support force-projection operations. Normally its infrastructure is built only to sustain the indigenous population and industry with minimal additional capacity being available to support US and coalition forces. The theater needs to have the capacity to move large numbers of units through its airport and seaport facilities. The theater also needs the necessary facilities to manage such functions as battle command, storage and transfer of ammunition, equipment maintenance, storage and movement of bulk petroleum, power generation and distribution, and rear-area troop staging and billeting. These functions are necessary for a synchronized flow of support to occur. The onward movement of follow-on forces and supplies is critical for success on the battlefield. Logistics planners work closely with the corps engineer to develop a suitable transportation infrastructure (ports, roads, bridges, railroads, and airfields). Anticipation of engineer requirements is crucial to ensure that adequate time is available to complete a robust infrastructure. Much of this work can be done by foreign/host-nation or US contractor personnel. These facilities can also be improved with the foresight of using engineer assets prior to the conflict during nation-assistance operations and other OOTW. Base development does not end once the conflict begins. On the contrary, base development needs will increase depending on the size of the force involved in the conflict. Each time the force expands or contracts, planners review facilities and LOC requirements to ensure that they are adequate to accomplish the mission.

### **Entry and Combat Operations**

During the decisive entry and combat phases of force-projection operations, the nature of engi-

neer operations places an extraordinary burden on the logistics structure. Rates of consumption for fuel, repair parts, construction and obstacle materials, mines, and explosives dictate the commitment of a large amount of maintenance and transportation assets in support of corps engineer forces. Engineer combat operations are dangerous by their very nature, which means that logistics planners anticipate and provide for the replacement of corps engineer personnel and equipment losses.

### **Conflict Termination, Postconflict Operations, and Redeployment**

When combat operations have ended, corps engineer forces may be asked to restore the war-torn area and to construct redeployment facilities. This phase of force-projection operations is critical to ensuring victory in war, and also victory in peace. Depending on the political and social factors of a conflict, devastation resulting from hostilities may require some restoration by our forces. This will require the same attention to detail in logistics anticipation planning and most likely the rotation of follow-on units working in concert with host-nation and US construction contractors.

### **INTEGRATION**

Operational and tactical plans integrate all logistical support such that it creates a synergism with the combat concept of operation. Logistical planners participate in and evaluate the logistical significance of each phase of the operation during the entire command-estimate process.

Engineer logistical plans will most likely be in support of joint and multinational operations. The theater commander integrates operations in his area of responsibility which often include engineer forces from other services or countries and possibly civilian engineering contractors. Army corps engineers are integrated fully with logistics support agencies to ensure mutual support.

### CONTINUITY

The corps commander needs continuous logistical capability in order to gain and maintain the initiative in combat. Continuity of operations is critical to success on the battlefield.

Corps engineer forces are always either committed to the current fight or in preparation of the next battle. The battlefield tempo requires a constant vigilance by both the logistician and engineer commander in ensuring a constant flow of support. Supplies are pushed (unit-distribution method) forward whenever logistically feasible. This is especially crucial to corps engineer units because they do not usually have lulls in their operations that would allow them to use the supply-point method of supply.

### RESPONSIVENESS

Versatility in logistics-support systems will enhance the supporting unit's responsiveness. Corps logistics planners structure the logistics force to be versatile enough to complement combat plans and operations, yet robust enough to ensure that there is no interruption of services. The structure is responsive enough to allow the commander to seize and maintain the initiative.

Corps engineer logisticians plan to meet the changing requirements of the battlefield on short notice. The engineer sustainment system should be versatile enough to keep pace with rapid decision cycles and mission execu-

tion and also react rapidly to crises or opportunities. Sustainment planners pay particular attention to engineer task-organization changes. Engineer units can normally respond to a change in task organization much quicker than the corps logistical-support packages can. Because of this, interim contingency engineer sustainment plans are normally developed such as the overstocking of critical engineer supplies and repair parts for use until corps logistical support packages are available.

### IMPROVISATION

Extraordinary methods may be necessary to ensure success on the battlefield. Corps logistical planners attempt to push support to engineer units forward to ensure smooth combat operations. Sometimes this is not feasible or supportable. They improvise by making, inventing, devising, or fabricating what is needed out of what is on hand. An example includes creating a demolition cratering charge using common fertilizer and diesel fuel. During Operation Desert Storm, crude oil and diesel fuel were also used as a substitute for unavailable dust palliative. Specific battle damage assessment and repair (BDAR) procedures have been developed based on the need to improvise on the battlefield. **Improvisation is not a substitute for good planning . . . . anticipate requirements.** Improvisation is one of the American soldier's greatest strengths; recognize it as an advantage in meeting emergencies.

## LOGISTICS PLANNING CONSIDERATIONS

Planning for corps logistics support involves several critical decisions concerning the interface of combat CS, and CSS activities in the corps. A corps logistics-support concept is developed, including support to corps engineer forces along with how corps engineers support the corps logistics system. Critical to this concept development are several corps logistics planning considerations.

### LOGISTICS PREPARATION OF THE THEATER

Logistics preparation of the theater are those actions taken prior to a crisis that enhance future corps logistical support during future force-projection operations. Corps engineers can assist in this process by identifying and preparing bases of operation and forward logistics bases. They can select and improve LOC.

They can identify theater construction equipment and materials. Corps engineers participating in OOTW can improve the theater's infrastructure through various operations such as nation-assistance and disaster-relief activities.

### LOGISTICS FORCE COMPOSITION

The speed of deployment and the expected level of threat to be encountered will dictate how the corps CSS force is structured in theater. The majority of initial logistics forces an objective area may be a primarily active component working with joint, host-nation, and coalition logistics-support agencies, especially in the early stages of force-projection operations. As the duration of the operation becomes longer, reserve component logistics forces will be phased in. Government civilians and contractors can provide many specialized logistics functions for the military possibly requiring their integration into combat operations and requiring detailed advanced planning. Some corps engineer construction units, such as combat heavy engineer battalions and CSE companies, may be task-organized and phased into the theater as logistics forces deploy and arrive.

### LOGISTICS PRIORITIES

The fact that the corps commander's resources are limited will always be a planning consideration in establishing priorities. The establishment of engineer logistical priorities considers a wide array of factors, such as—

Ž Commander's intent.

- Commander's concept of the operation.
- Host-nation assets.

Ž Joint-service capabilities.

Ž Multinational/coalition-nation capabilities.

- Systems interoperability.
- Availability of sealift and airlift into the theater.
- Suitability of air, ground, and sea LOC.

Corps engineer logistics priorities can shift between units or maybe focused on a particular area. Shifting priorities between units or areas requires close scrutiny and coordination by the logistics planner to ensure that there are no lapses in support. The shifting of priorities from one location to another on the battlefield is an extremely complicated process with a high potential for failure. Some examples of potential reasons for shifting priorities are—

- Reconstituting the force.
- Exploiting enemy weaknesses on the battlefield.
- Preparing for future operations such as counterattacks.
- Continuing with success of a current operation.

Corps engineers may receive priority for certain corps logistics supplies such as Class IV construction materials or Class V mines and demolitions. Corps bridge companies may be directed to support corps line-haul operations after downloading bridges. Priorities for corps engineer work may be required for the construction of logistics bases and MSRs.

### JOINT LOGISTICS

The nature of joint logistics at the strategic level ensures its integration with national systems. Integration of joint logistics at the operational level requires detailed planning and synchronization between all service organizations. The logistical force structure for a joint operation usually requires multiple task-organization changes as the theater matures.

The CINC or JTF staff will ensure that logistics are integrated by delegating responsibility for various classes of supply. For instance, the Air Force may be responsible for all aviation fuel and Class VIII (medical) supplies, the Army would provide Class I (food and water) and Class III (packaged and bulk) supplies, while each service would handle its own Class V (ammunition) supplies. Army corps engineers could receive Class IV materials from joint-service supply points such as those established by Naval seabees.

### MULTINATIONAL LOGISTICS

Logistics in a multinational operation is much the same as in a joint environment but much more complicated. Logistics support is normally a national responsibility; however, arrangements may be made for US corps logistics agencies to supply coalition partners with such things as food and water, some ammunition, POL, medical supplies, construction and obstacle materials, mines, some vehicles, and maps. Although some logistical functions may be suitable for purely national operations, many are not. Movement control; the operation and use of ports, airfields, or LOC; and logistical communications systems are perfect examples of supply functions better suited for multinational operational control. Weapon, equipment, and battle-command systems compatibility is the biggest obstacle to overcome in synchronizing logistics in a multinational operation. The method of integration and synchronization of multinational assets depends on many factors. Technological capabilities, tactical training, national economic well-being, host-nation contracting capability political issues, or even cultural differences are all considerations in determining an appropriate logistics system. If members of an alliance use similar equipment or systems, plans should include consolidation of maintenance, resupply, and other support operations. Although many of our possible coalition partners have bought like engineer equipment systems, such as the bulldozer or grader, none of our allies' engineer

forces are completely compatible with US engineer forces. Incompatibility with coalition communications systems can be an even bigger problem for synchronizing adequate multinational logistics support on the battlefield. LOs are essential to ensure successful multinational logistics operations.

### FOREIGN/HOST-NATION SUPPORT

The use of foreign/host-nation assets allows greater flexibility to assign US logistical units other missions that are more critical to success on the battlefield. It also reduces the initial requirements for strategic sealift and airlift which allows critical transportation assets to be dedicated to deploying more combat power. However, foreign/host-nation support should not be relied on as a sole source of logistics support. Preestablished foreign/host-nation support agreements, such as Status of Forces Agreements (SOFAs), can significantly improve logistical support systems. These agreements must be made prior to the outbreak of hostilities and cannot be relied on for critical logistical requirements. Regardless of the presence of a preestablished agreement, the corps commander ensures the force has contracting and real estate capability deployed early enough to acquire the necessary foreign/host-nation assets. Some of the typical logistical support that can be provided by foreign/host-nation assets is—

- Ž Government agency support. The foreign/host nation may operate systems such as transportation, utilities, and telephone networks in support of US forces. It can also provide police, fire, and local security forces in support of rear-area operations.
- Ž Contractor support. Foreign/host-nation, third-country nationals, or US contractors can provide supplies and services such as construction, labor, laundry, bath, bakery, and transportation. Pre-

arranged LOGCAP contracts can also provide these services.

- Foreign/host-nation civilians or third-country nationals. These civilians can perform a wide array of services for the commander. Some of the civilian skills that may be required include construction laborers, linguists, stevedores, truck drivers, rail operators, air-traffic controllers, utility specialists, and technicians.
- Foreign/host-nation military units. Foreign/host-nation military or paramilitary units support wartime functions such as traffic control, convoy escort, installation security, cargo and troop transport, fuel storage and distribution, and rear operations.
- Foreign/host-nation facilities. The use of existing foreign/host-nation facilities can relieve the commander of the need for a great deal of new construction. Such facilities as billets, maintenance shops, medical and dental clinics or hospitals, logistical activities, and recreational areas can be provided by a contractual agreement.
- Supplies and equipment. The availability of critical supplies is highly dependent on the TO. Such things as construction materials (lumber, bricks, concrete, asphalt, and so forth), construction equipment and tools, and obstacle materials will drastically reduce engineer lift requirements into the TO.

METT-T analysis determines the ultimate decision to use foreign/host-nation assets and appropriate foreign/host-nation support battle command. Consider the following factors in determining the suitability of using foreign/host-nation resources to accomplish logistics-support missions and functions in the area of responsibility (AOR):

- The effect of the failure of compliance with a foreign/host-nation asset on US security.
  - The reliability of the foreign/host-nation support provided.
  - The capability, dependability, and willingness of the foreign/host nation to provide and sustain identified resource needs.
- Ž The political, social, and economic considerations associated with the use of foreign/host-nation assets.
- The risk associated with foreign/host-nation support being unavailable in wartime in the type and quantity agreed upon.

## CONSTRUCTION CONTRACTING ACTIVITIES

The majority of logistical contracting actions will be accomplished by the corps G4. Corps combat engineer forces will not normally get involved with normal contracting actions in the TO. The corps engineer assists the corps G4 in coordinating construction contracting actions being accomplished by the foreign/host nation and the USACE by identifying requirements in terms of US engineer force equivalents. The forward-deployed USACE command (USACE (FWD)) maybe part of the Army component of a JTF and yet respond directly to the JTF commander through the JTF engineer on contract construction issues. The USACE (FWD) may also be engaged in real estate leasing operations as well as other Army support missions (for example, maintenance of the Theater Construction Management System (TCMS), water detection, and so forth). To the extent that the corps requires USACE support USACE (FWD) may place a liaison cell with the corps SES and/or, if required, a contract execution section with the corps engineer brigade headquarters. Regardless of the ultimate arrangements for support, the ACE and the USACE (FWD) com-

mander will work closely together to ensure that the corps's engineering contracting needs are met.

### **LOGISTICS CIVIL AUGMENTATION PROGRAM**

The LOGCAP is a DA program that provides responsive contract capability to augment US forces with facility and logistics services during contingencies/wartime. As the program's executive agent, the USACE provides program management, coordinates LOGCAP requirements with supported major Army commands (MACOMs), and administers the LOGCAP contract. The G3, the G4, the corps engineer, and the comptroller are key players in developing LOGCAP requirements and ensuring the appropriate mix of contractor and troop support. Three major types of activities are supported by the worldwide LOGCAP contract facilities operations, maintenance, repair, and construction; all other nonfacility logistics services (for example, POL, transportation, food/water, and maintenance); and contractor planning expertise to assist MACOM/contingency planners. LOGCAP is especially suited to support reception, staging, and onward movement (RS&O) operations. Additionally LOGCAP can augment engineer units (operate Class IV supply yards and provide construction equipment), provide facility engineer support and support COMMZ-oriented construction.

### **CAPTURED ENEMY RESOURCES**

Captured enemy resources are another asset that may become available during combat op-

erations. Corps engineer use of captured obstacle and construction materials, mines and demolitions, and engineer equipment can significantly reduce logistical requirements in the AOR with appropriate safety awareness and operational training. Food, POL, water, and medical supplies can be used to support EPW camps or holding facilities. Captured facilities can be used in a variety of ways to support logistics operations.

### **SUPPORTING OPERATIONS OTHER THAN WAR**

OOTW may require the same or a greater level of logistical support as wartime operations. Combatant commanders tailor logistics support of these operations based on theater needs. In some cases, logistics-support units and corps engineers may be the only forces involved in the theater. The logistical operation may be the main effort in certain situations, such as humanitarian-assistance operations. Corps logistics efforts are integrated with host-nation or local resources and activities. The wide variety of potential support requirements demands a flexible logistics structure tailored to theater missions. Corps engineers invariably get involved with a wide variety of missions that may need flexible logistics support. Critical engineer logistical considerations during OOTW include the availability of construction equipment DS maintenance capability repair parts supply, Class IV construction materials, and the need for engineer LOs.

## **CORPS LOGISTICS OPERATIONS**

Corps logistics elements are organized to provide military forces with supply, maintenance, transportation, and field services. Corps units are supported by the COSCOM whether they are operating in division, separate brigade, cavalry regiment, or the corps rear areas (see Figure 4-1). The COSCOM provides corps-

level logistics support and health-services support to corps units and theater units attached to the corps. Corps units attached to divisions are supported by the DISCOM. All other corps units operating in division areas receive logistics support from COSCOM units operating in nearby areas. Health-services support for



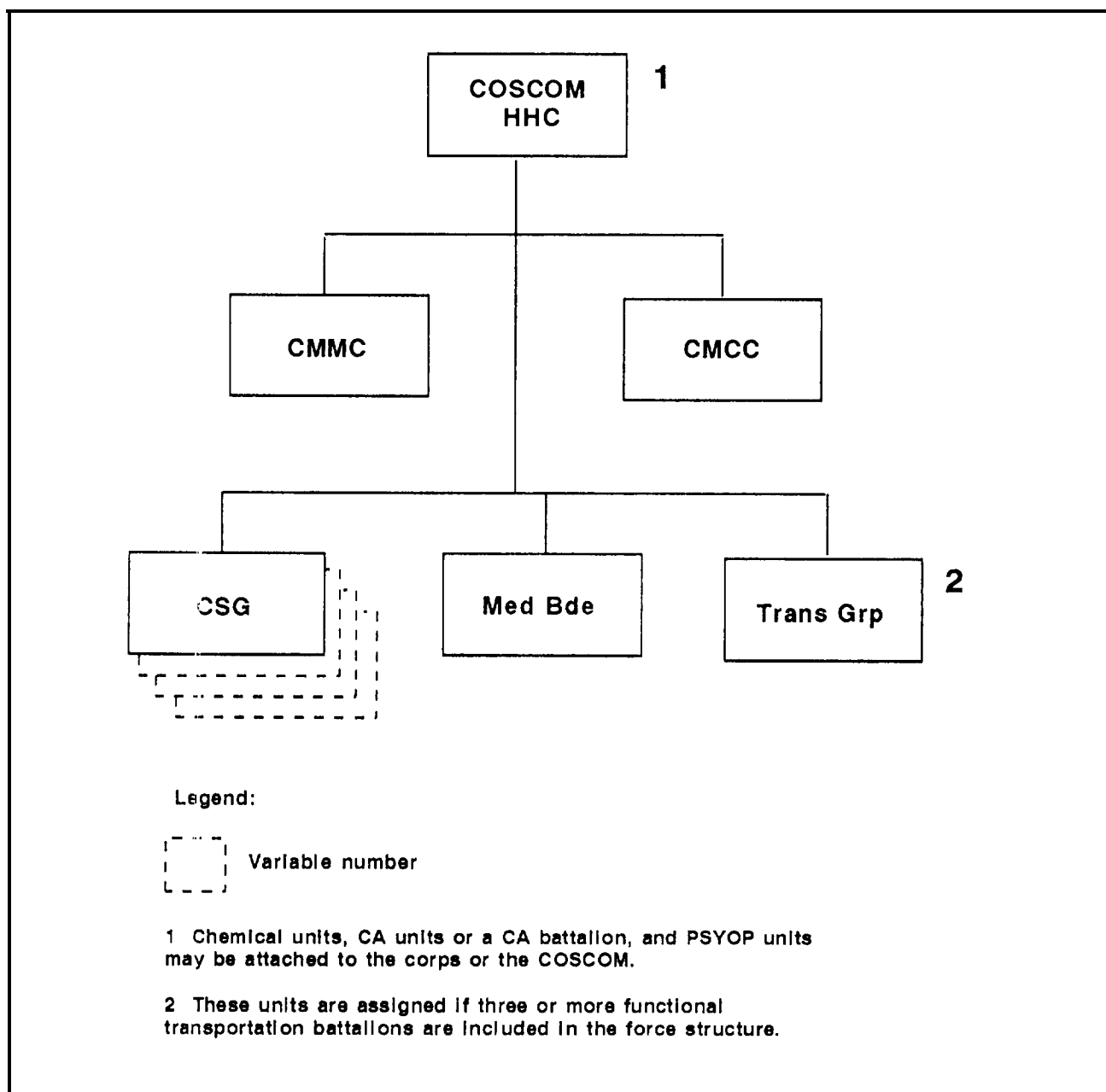


Figure 4-1. COSCOM organization

corps units operating in division areas are provided on an area basis by the division medical-support structure.

### CORPS SUPPORT COMMAND

The COSCOM is the principal logistics organization in the corps. It provides supply field services, transportation (node operations and

movement control), maintenance, and medical support to divisions and nondivision units of the corps. The COSCOM is not a fixed organization; it contains a mix of subordinate units as required by the corps's size and configuration. Within the COSCOM, corps support groups (CSGs) provide supply (except Class VIII), maintenance, and field services to division and nondivision units (see Figure 4-2, page 4-10). A

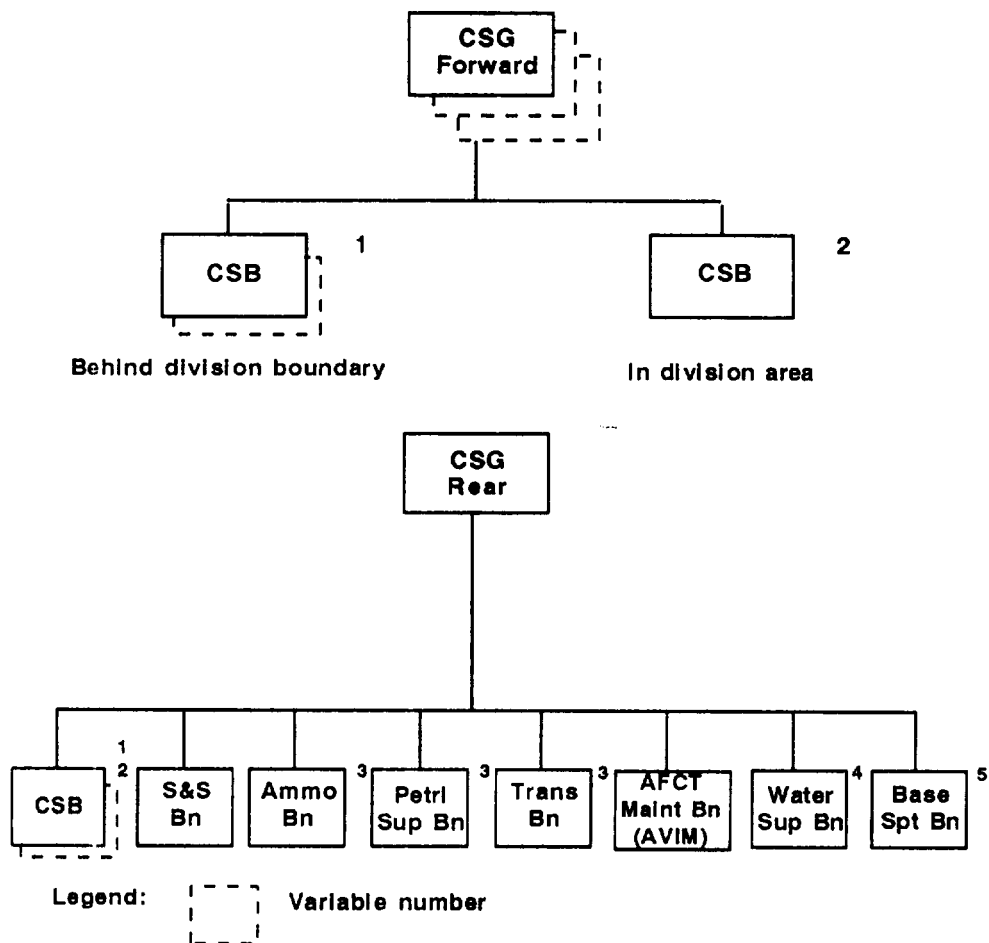


Figure 4-2. Forward and rear corps support group organizations

corps medical brigade provides medical support, and a transportation group may be assigned to the COSCOM. Personnel and finance support are provided by functional commands.

A task-organized DS battalion from the CSG normally sustains corps engineer units deployed in division areas. To support forward corps units, including engineers, these COSCOM units habitually locate in the vicinity of division rear boundaries to render timely effective support. However, some corps engineer units may operate too far forward for the COSCOM to provide support such as corps engineer battalions supporting cavalry regiments. In these cases, the maneuver unit will normally be logistically augmented by the COSCOM to provide needed support to the forward corps engineer units. Corps engineer units operating in the corps rear area will normally be sustained by CSG support units and systems, usually on a supply-point basis. All corps engineer units directly establish individual logistics accounts with various COSCOM support agencies in theater.

### **COMMAND AND SUPPORT RELATIONSHIPS**

Command and support relationships determine how corps engineer units will be sustained. Normally maneuver units do not have the capability to logistically sustain corps engineer units. For this reason, most corps engineers are placed in DS or OPCON roles to maneuver forces. Parent corps engineer organizations track subordinate unit missions and their status in order to properly allocate and provide sustainment resources from the corps. Corps engineer units are rarely attached to maneuver or other units because it requires the supported unit to provide logistical support except for personnel and administration activities. Command and support relationships can be altered to fit various situations. For example, theater engineers on a task in the corps area will be supported by the COSCOM. Corps engineers operating in a division area may receive support of common classes of supply and

limited vehicle maintenance support from the DISCOM and its FSBs. Regardless of the command or support relationship, all corps engineer units must exchange logistics coordination and status information through engineer channels to the corps engineer brigade CP. See Figures 2-9 and 2-10, pages 2-30 and 2-31, concerning corps engineer logistics information flow.

### **PERSONNEL-SERVICES SUPPORT**

Personnel-services support is the management and execution of personnel services, resource management, finance services, chaplaincy activities, command information services, and legal-service support.

The S1/G1 has staff responsibility for coordinating personnel-services support. Religious, legal, and public-affairs support is provided by elements organic to engineer units. Morale, welfare, and recreation (MWR) support is procommand and a variety of external agencies.

Personnel support is provided through the personnel groups who exercise C2 over subordinate elements, including personnel-services battalions, postal companies, replacement companies, and bands. These elements operate on both area and DS bases and support both division and nondivision units. Personnel and administration services include strength and personnel accounting, casualty reporting, replacement operations, awards, military personnel management, Red Cross services, and civilian personnel management. For doctrine on personnel and administrative support, see FM 12-6.

Finance support is provided through the finance group and its subordinate finance battalions, which have the capability of fielding finance detachments. These units provide military pay, disbursing, travel, and commercial vendor service on an area-support basis. For doctrine on finance support, see FM 14-7.

Figure 4-3 shows the corps personnel strength accounting channels used by engineers on the battlefield. Figure 4-4 shows how engineer replacements are managed in the corps's AO.

Figure 4-5, page 4-14, shows area and corps finance support.

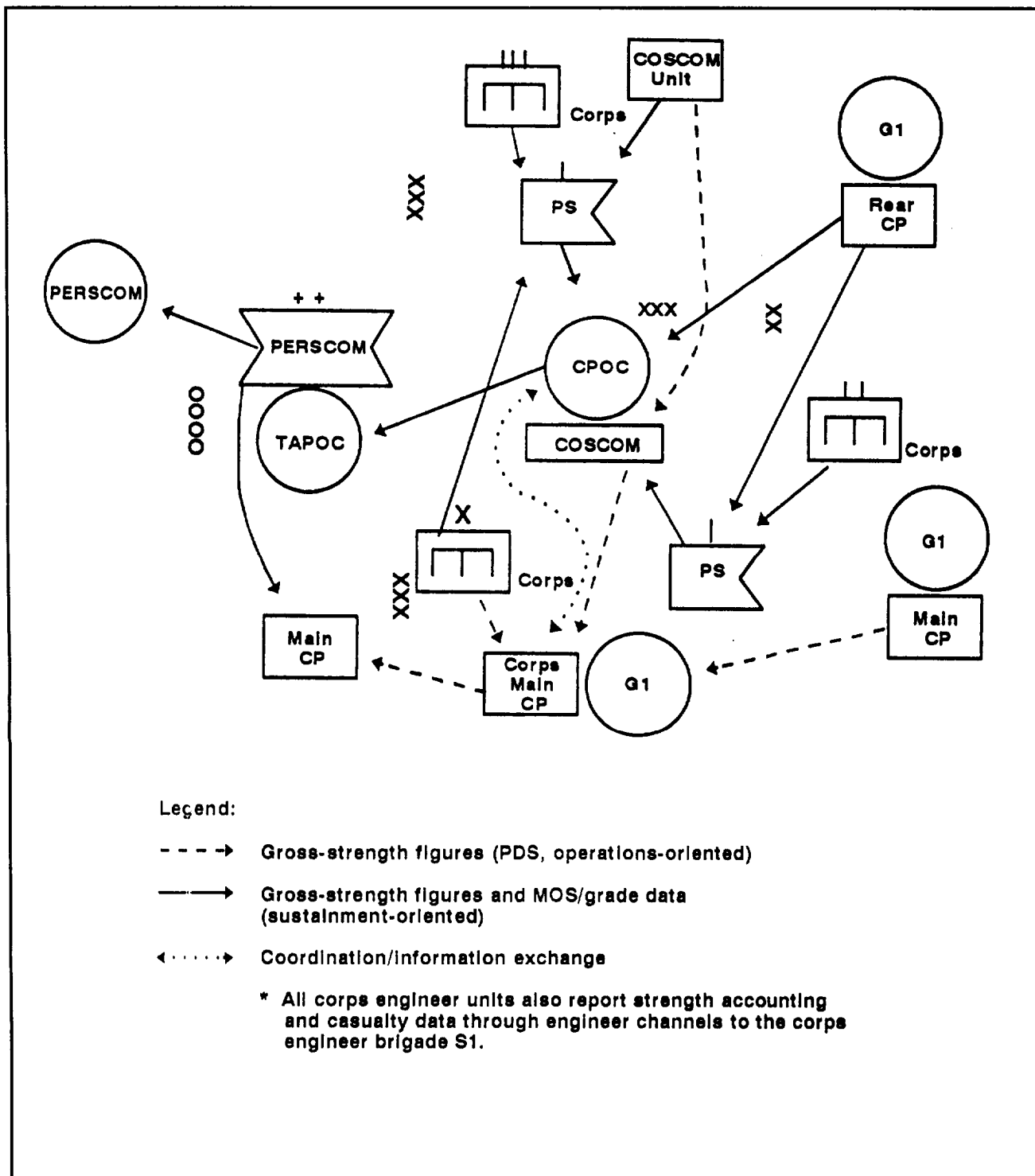


Figure 4-3. Strength accounting data and casualty reporting flow

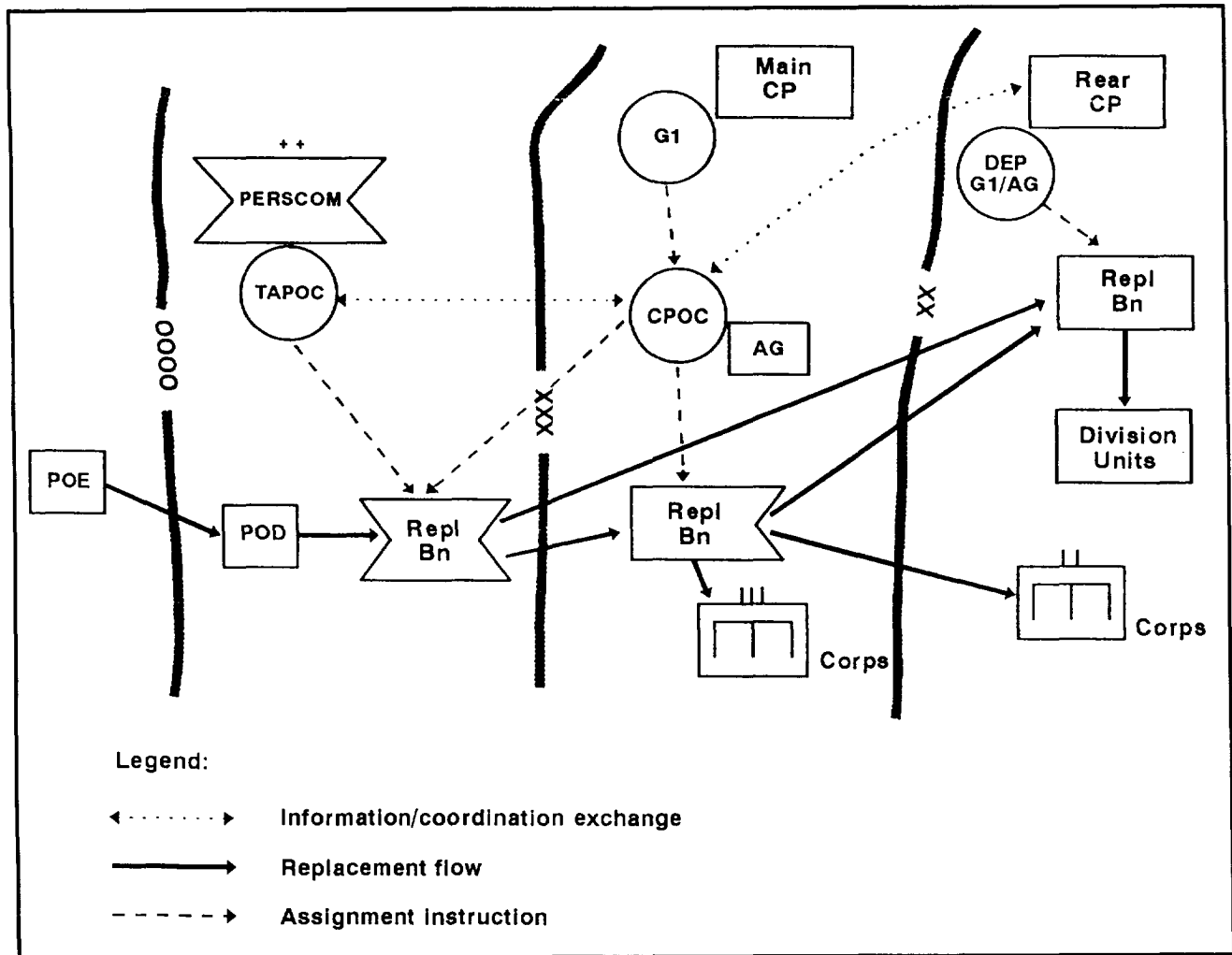


Figure 4-4. Replacement flow

### HEALTH-SERVICES SUPPORT

Health-services support relates to all elements of medical care for the soldier. There are four levels of health-services support in the theater: unit division, corps, and EAC. Each higher level of support contains equal treatment capability as the lower level plus a new increment of treatment capability which sets it apart from the lower level of support. The corps medical brigade provides health-services support to corps engineer forces in the areas of—

- Ž Emergency medical treatment and evacuation of casualties.

- Ž Preventive-medicine services.

- Ž Medical logistics (Class VIII supply and resupply).

- Ž Hospitalization support.

- Ž Medical regulation of patients.

- Ž Whole-blood management

- Ž Dental services.

- Ž Veterinary services.



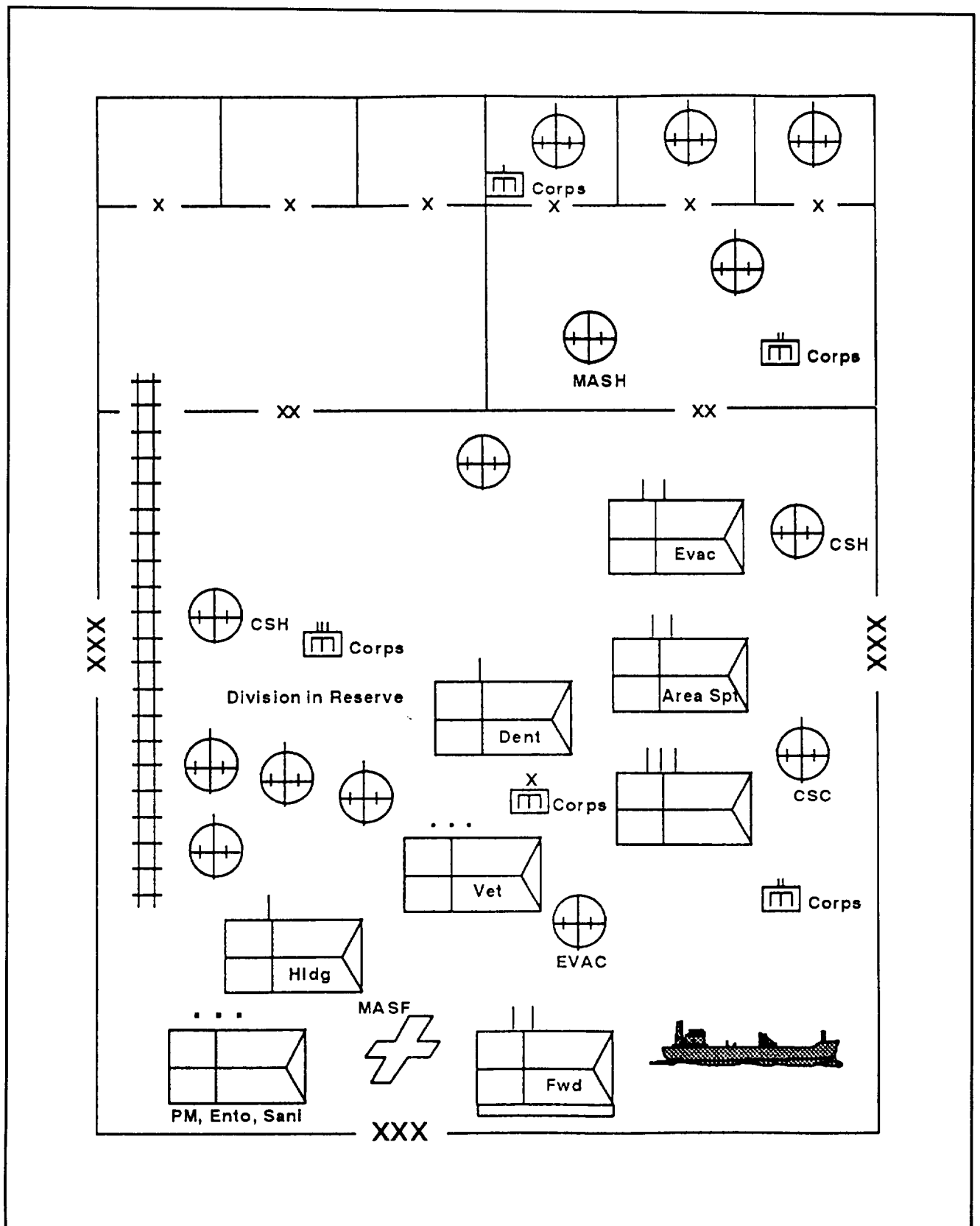
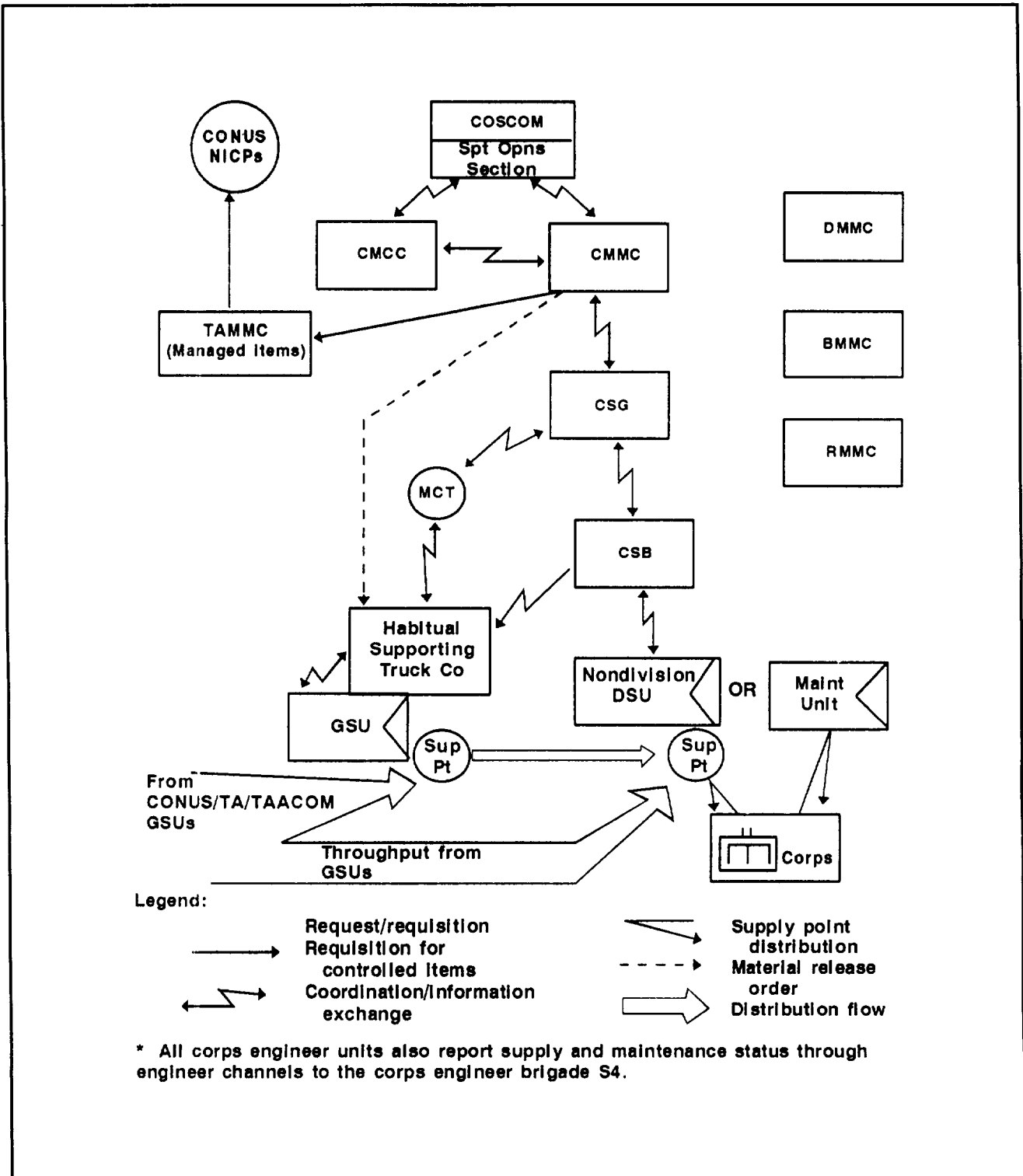


Figure 4-6. Sample employment of health-services-support elements on the battlefield

mines and demolitions. In general, the engineer supply request and material flow for Classes I, H, III, IV, and VII can be depicted as

shown in Figure 4-7. Figure 4-8 shows the flow of Class IX repair parts and maintenance-related Class II supplies.



**Figure 4-7. Generic requisition and distribution flow**



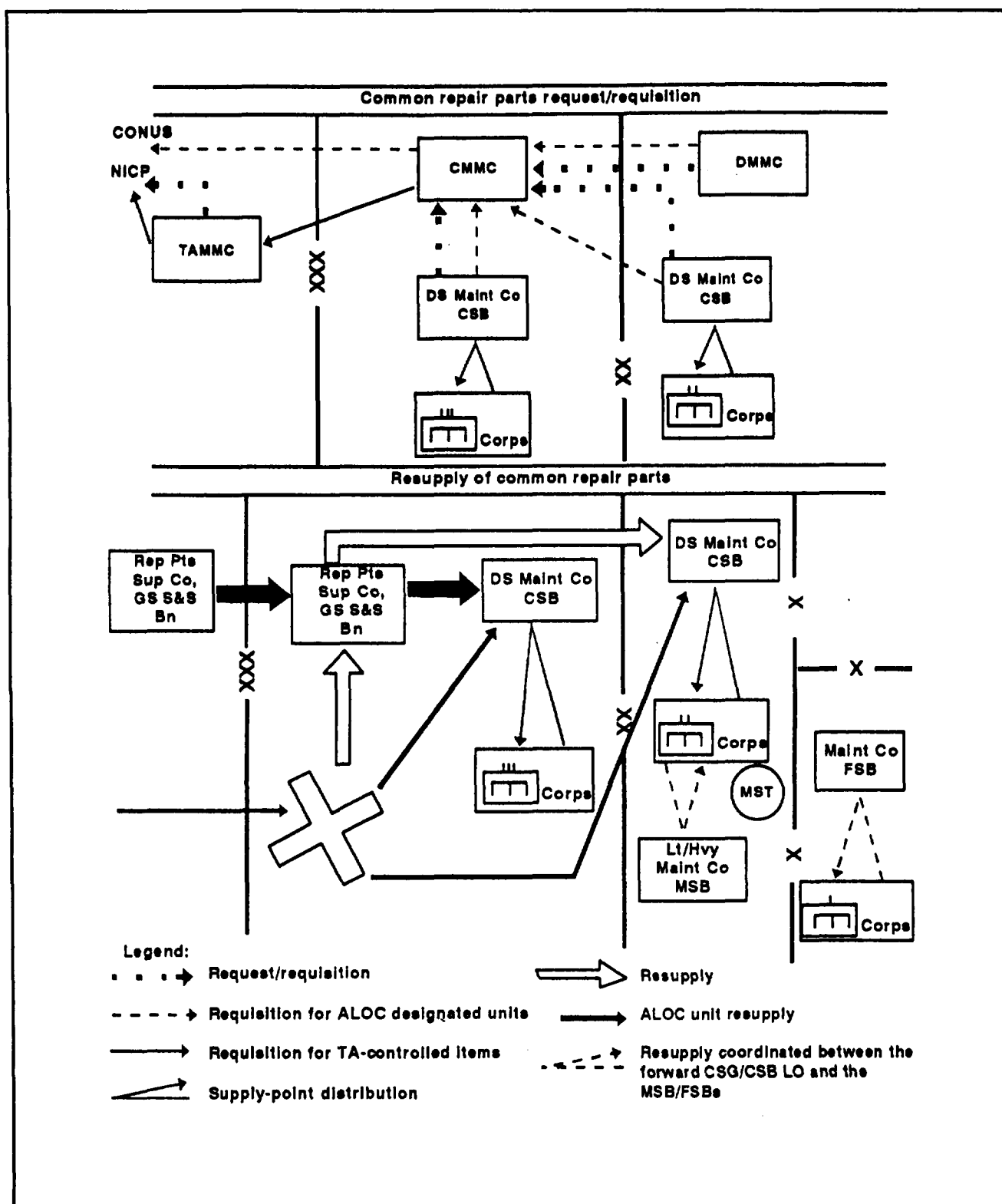


Figure 4-8. Requisition and supply flow of common repair parts and maintenance-related Class II supplies

### Class III POL Supply

Engineer forces require an enormous amount of Class III POL to operate. The following should be considered to ensure an adequate flow of POL to the corps engineer units:

- Ž Commanders develop forecasts to support the concept of operation.
- Ž Forecasts are submitted through the CMMC.
- Ž Supply units submit usage reports to the CMMC.
- Ž A distribution plan is developed by the CMMC based on available POL and the commander's priorities.
  - The petroleum battalion (GS) distributes POL to nondivision DS supply units using unit supply distribution.
- Ž The engineer user normally picks POL up from the DS supply unit via supply-point distribution.
- Ž Figure 4-9 depicts the normal flow of engineer POL supply in a corps's AO.

### Class IV Supply

Class IV supplies are handled by COSCOM heavy material supply and general supply companies. These items are usually heavy tonnage and are critical to the war effort. The corps G3 keeps the COSCOM informed of breaching, bridging, obstacle, or construction supply requirements which significantly change Class IV supply estimates. Class IV supplies are normally a low priority for the G3 and G4, requiring the corps engineer to continually keep attention focused on needed Class IV supplies. The COSCOM's Class IV supply support organization consists of—

- Ž DS supply companies that receive, store, and issue 29.65 short tons (STONs) of

Class IV items per day to nondivision units in their AOR.

- Ž A general supply company that can receive, store, and issue 212 STONs of bridging equipment, obstacle, and construction supplies daily.

### Class V Supply

Class V supply requirements for corps engineer units are satisfied by the COSCOM GS ammunition companies. A minimum of one corps storage area (CSA) for ammunition is located behind each division to support the ASPS and ammunition transfer points (ATPs) for operations. Conventional ammunition may be the dominant factor in determining the outcome of conventional combat. The mission of the conventional ammunition support structure is to provide the ammunition to meet the mission requirements of operational and tactical commanders. The Maneuver-Oriented Ammunition Distribution System (MOADS) is designed to provide 100 percent of the combat units' requirements through the ATP network. Normally corps transportation is allocated and operates in a DS role to support ammunition shipments from the CSA to ASPS and ATPs. This system provides engineer units with the normal Class V ammunition as well as mines and demolitions required to accomplish their missions.

Engineer commanders control the flow of ammunition by using two ammunition supply rates: the required supply rate (RSR) and the CSR. The RSR is the amount of ammunition needed to sustain tactical operations, without restrictions, over a specified period of time. The RSR is developed by the G3/S3 and submitted through operational channels. The CSR is the amount of ammunition that can be allocated based on the availability of ammunition assets, Class V storage facilities, and transportation assets over a specified period of time. The CSR is announced through logistical channels.

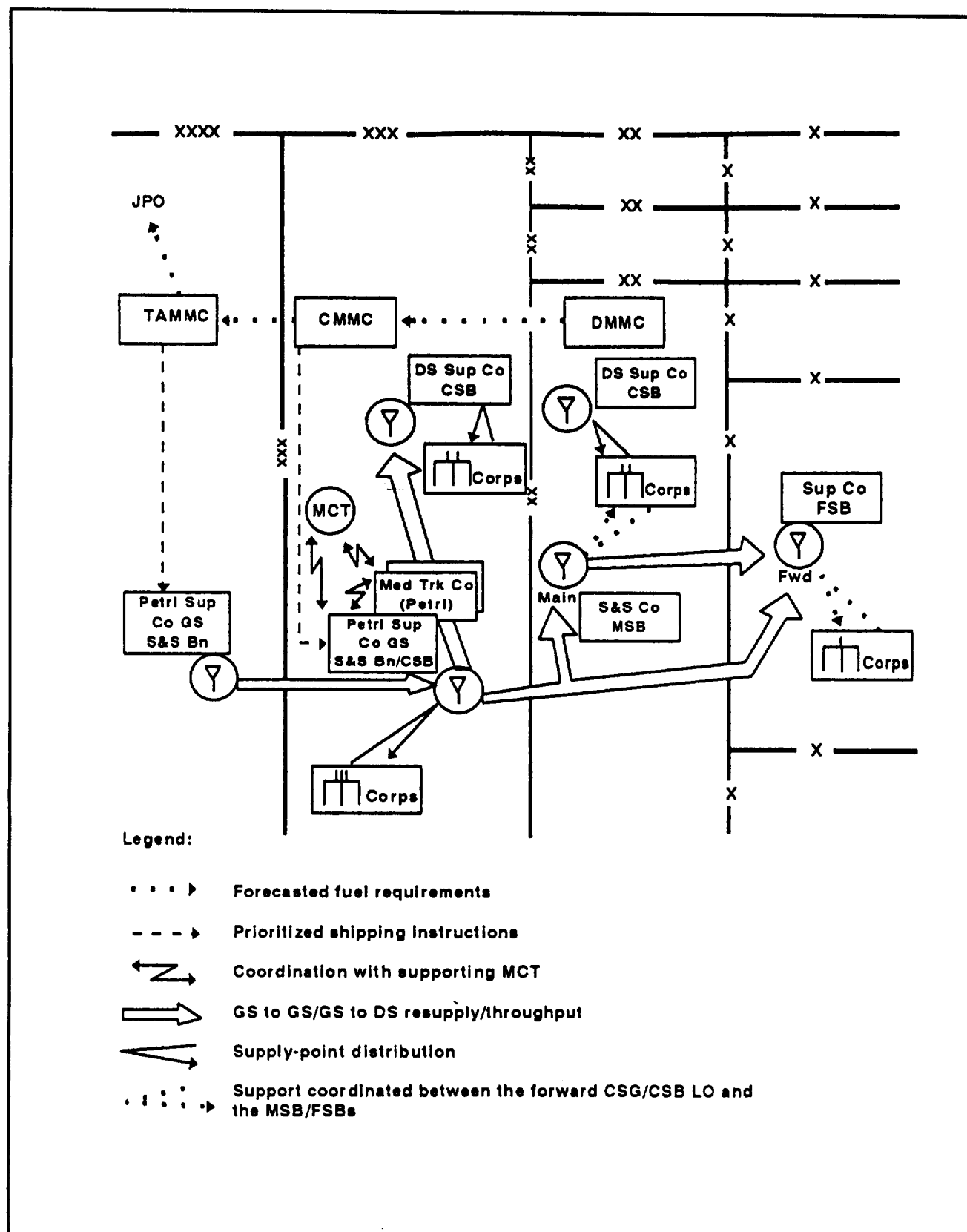


Figure 4-9. Bulk fuel requirements

Requirements for engineer weapon systems are estimated in the same manner as other combat arms systems. In many instances, sound judgment and METT-T considerations will be the only tools available to make these estimates (for example, the identification of how many MICLICs are required to perform all breaching operations in the main battle area (MBA)). A detailed understanding of the commander's intent and concept of the operation are crucial to accurately estimate the RSR. Figure 4-10 shows a typical engineer ammunition distribution system in a corps's AO.

#### **Class IV/V Distribution**

It is essential that COSCOM logistics-support elements provide unit distribution to deliver Class IV and V supplies as far forward as possible to corps engineer forces. Corps engineer unit on-hand basic loads of Class IV and V materials allow quick initiation of engineer missions; however, a unit's basic load will normally not sustain the unit throughout the operation. Unit distribution requires the use of the corps transportation assets to allow engineer transportation and personnel assets maximum time to concentrate on preparing the battlefield for operations. This is particularly important for corps engineer units supporting maneuver units and is commonly called the *push* method for supplying forward units. Engineer mission resource requirements are normally large, bulky, heavy, and not readily available in theater. These requirements are anticipated by all command levels to make maximum use of preparation time. For this reason, logistics and engineer planners push Class IV and V supplies forward as soon as possible, even if the exact quantities are still not known. Standard logistics packages (LOGPACs) provide the best method in pushing forward engineer logistics for missions. These LOGPACs are normally configured based on METT-T in the COSCOM by the DS supply company for Class IV supplies and the GS ammunition company for

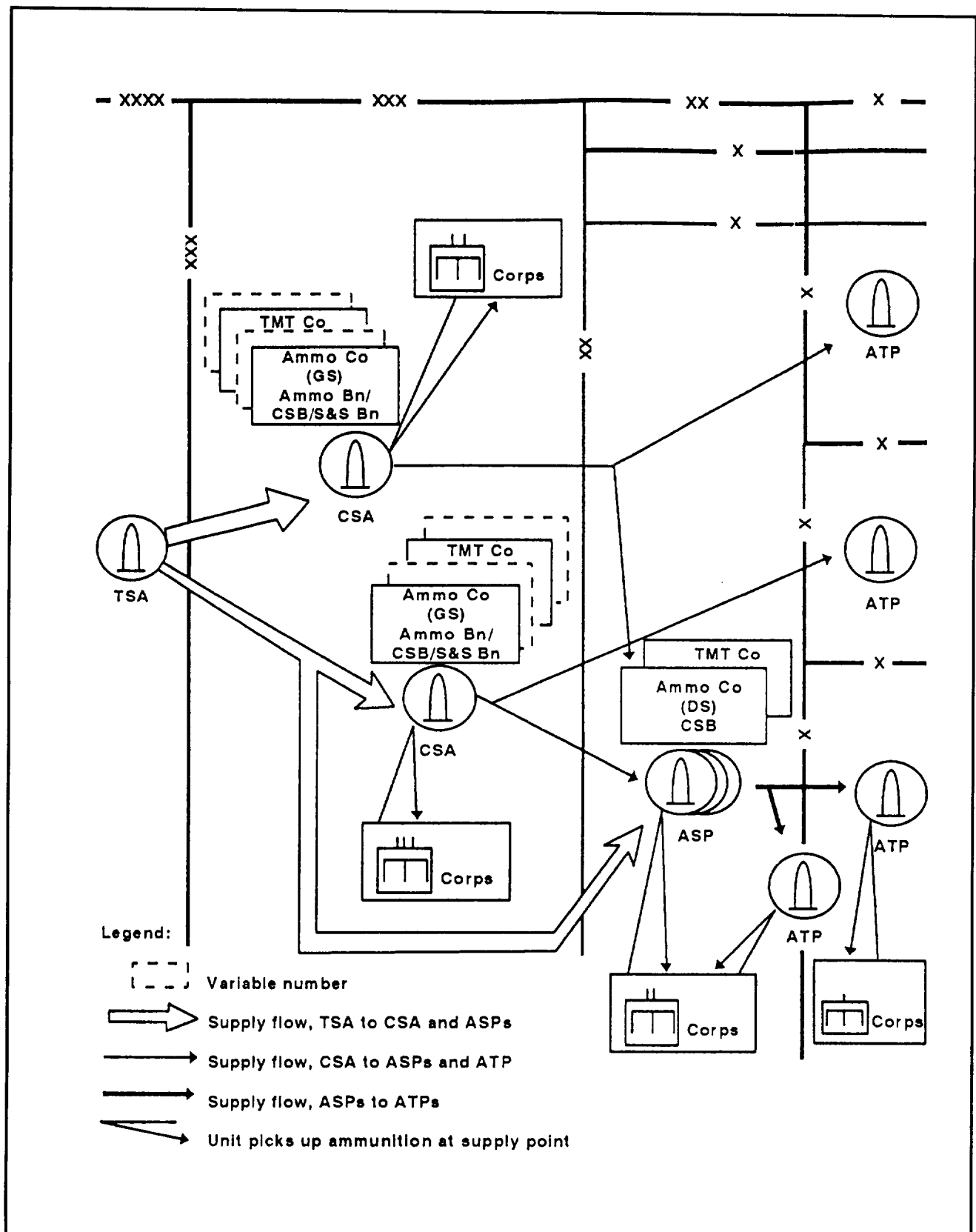
Class V supplies. Once quantities are known, the G4, the CMMC, the corps movement control center (CMCC), and COSCOM staffs will procure and ensure the transport of required engineer materials to point distribution areas.

#### **TRANSPORTATION AND MOVEMENT**

Movement is inherent in all combat operations. It is the one element that ties together sustainment and all the other BOSS. Moving the force includes not only transporting equipment and personnel, but also controlling the entire transportation system. Transportation organizations provide support to corps engineer forces in three basic functional areas: node operations, movement control, and terminal operations.

Transportation management ensures that planning maximizes the use of available transportation resources to meet the command's movement requirements. The CMCC coordinates and monitors the movement of corps engineer forces within the corps area. Movement control teams (MCTs), movement regulating teams (MRTs), and air terminal movement control teams (ATMCTs) are established to reduce the CMCC'S span of control and to provide more responsive support to the transportation system users. MCTs, MRTs, and ATMCTs generally report directly to the CMCC and are located at points that allow close and constant coordination with the installations and units to be served. During joint operations, the joint movement control cell (JMCC) manages transportation requirements at the JTF level. Figure 4-11, page 4-22, depicts engineer movement support in the corps's AO.

Engineers provide valuable assistance to another movement control system, battlefield circulation control (BCC). The traffic flow on MSRs and alternate supply routes (ASRs) is crucial to ensuring success on the battlefield. The main players in this system are the CMCC, transporters (COSCOM and the G4),



4-10. Flow of ammunition within the corps

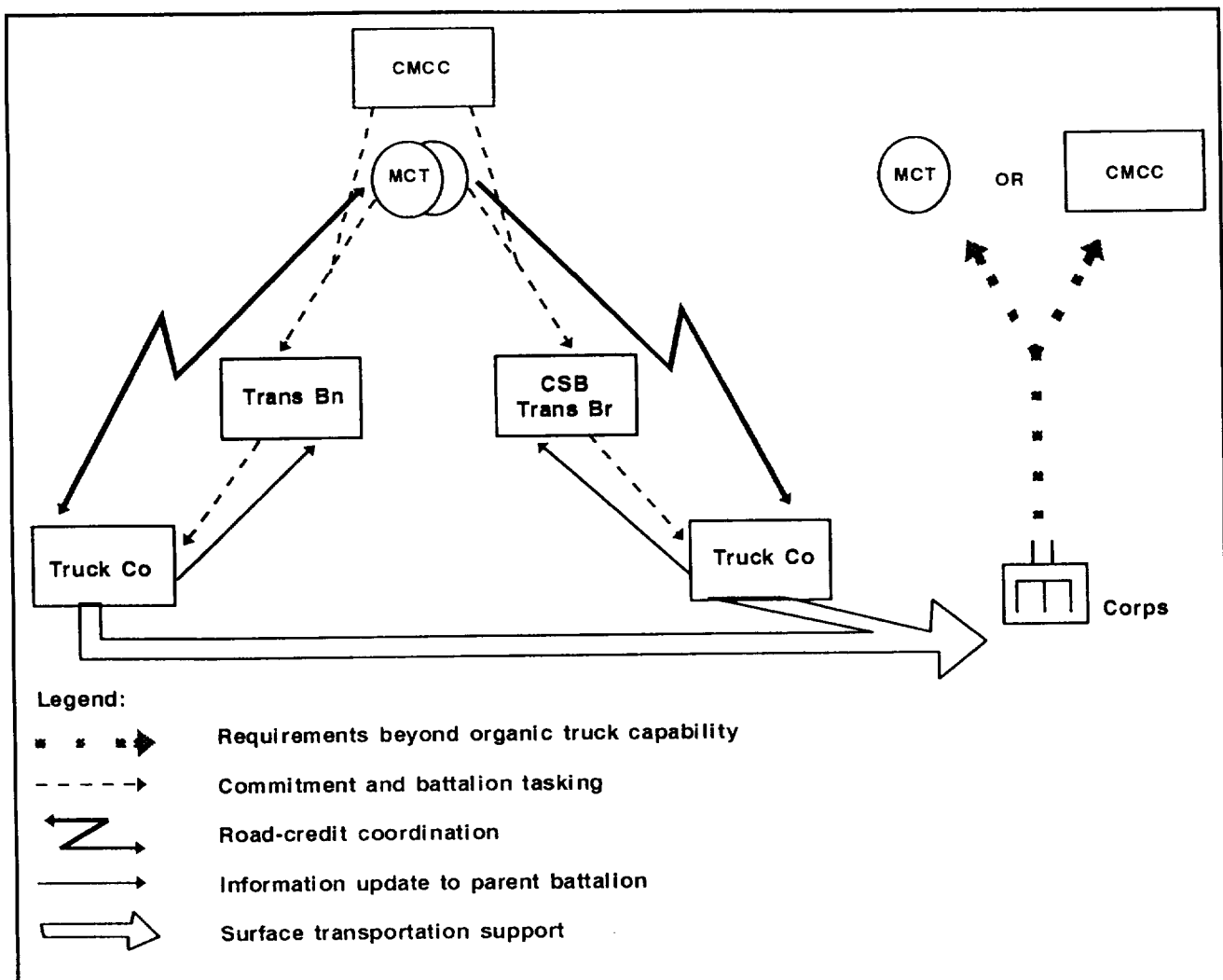


Figure 4-11. Ground transportation request and commitment flow

MP, engineers, and the units moving along the supply routes. Daily coordination between all of these elements is essential to ensure smooth traffic flow. This coordination reviews such things as battle damage assessment (BDA) reports, corps movement priorities, future division- and corps-level movements, the threat situation, and the availability of transportation assets. Corps engineer forces are responsible for constructing, upgrading, and maintaining MSR in the corps sector. METT-T may dictate the need to use corps engineer assets in the division sectors to improve MSR critical to future corps operations.

### MAINTENANCE SUPPORT

The corps maintenance system is developed around the idea of "fix forward." Maintaining corps engineer equipment is critical to ensure operational success. Low-density/high-usage engineer equipment requires intensive management by the corps engineer and corps logisticians. Management of certain repair parts and supplies needed for maintenance of this equipment is critical, especially filters, tires, and cutting edges.

Fixing engineer equipment and systems encompasses much more than maintaining on-hand equipment. It includes recovering,

evacuating, supplying repair parts, and replacing major items. The nature of the battlefield, combined with the complexity of engineer operations, demands that repairs be made quickly and as near as possible to the point of failure or damage. This means that repair parts and maintenance teams must be pushed as far forward as possible. The attachment of DS maintenance support teams to corps engineer units helps facilitate this forward maintenance support. BDAR kits should be maximized whenever feasible. Figures 4-12 and 4-13, pages 4-24 and 4-25, depict typical corps engineer equipment maintenance flow on the battlefield.

## FIELD-SERVICES SUPPORT

Field services available to corps engineer forces include food service, airdrop, laundry clothing exchange and bath, renovation, bakery, classification, mortuary services, RPMA, post exchange sales, camouflage, and explosive ordnance disposal (EOD). Corps field services directly impact on the safety morale, and welfare of soldiers. Corps engineers support field services as required primarily with general engineering tasks. RPMA and camouflage are normally considered engineer areas of expertise. Corps engineers also augment EOD operations by conducting mobility operations through concentrations of UXO.

## CORPS ENGINEER SUPPORT TO LOGISTICS OPERATIONS

### LINES-OF-COMMUNICATION CONSTRUCTION

LOC are often equated to MSRs, but they are much more. According to FM 100-5, LOC are all the routes (land, water, and air) that connect an operating military force with a base of operations and along which supplies and military forces move. Lines of support are intratheater extensions of LOC. If the theater's infrastructure is underdeveloped, corps and theater engineer forces will need to arrive early in the force flow to establish the minimum required infrastructure to support the force. The establishment of priorities of corps engineer effort will be crucial in the initial stages of force flow. Potential LOC engineering missions include: port construction or upgrade; airfield construction, upgrade, or repair; MSR/ASR construction, upgrade, or repair; and bridge construction, upgrade, or repair.

### Logistics-Facility Construction

Corps logistics operations may require the use of facilities such as Force Provider, ASPS, POL bladder farms, supply points, and maintenance bays. Corps engineers may be required to provide limited construction and prime-power electrical support to logistics facilities.

### Water Supply Support

Corps engineers may be required to support water detection, development of water sources, and water storage and distribution systems in the corps area. Topographic engineer support and water-detection teams from the USACE assist with finding water sources. Well-drilling teams or contracted well-drilling support with organic logistics support develop water sources. Engineer tasks associated with water storage and distribution include site preparation for storage tanks and bladders, and construction of storage tanks and water distribution lines, possibly by contract.

### MEDICAL-FACILITY CONSTRUCTION

The construction of corps medical facilities may place one of the largest demands on engineer forces. The corps engineers provide construction-related support to all COSCOM units in the corps's AO, but none are more demanding than the health services. The use of existing host-nation facilities is preferred, but construction of adequate medical facilities may be needed to support the force.

Site preparation requirements vary with the type of hospital and the nature of the terrain.

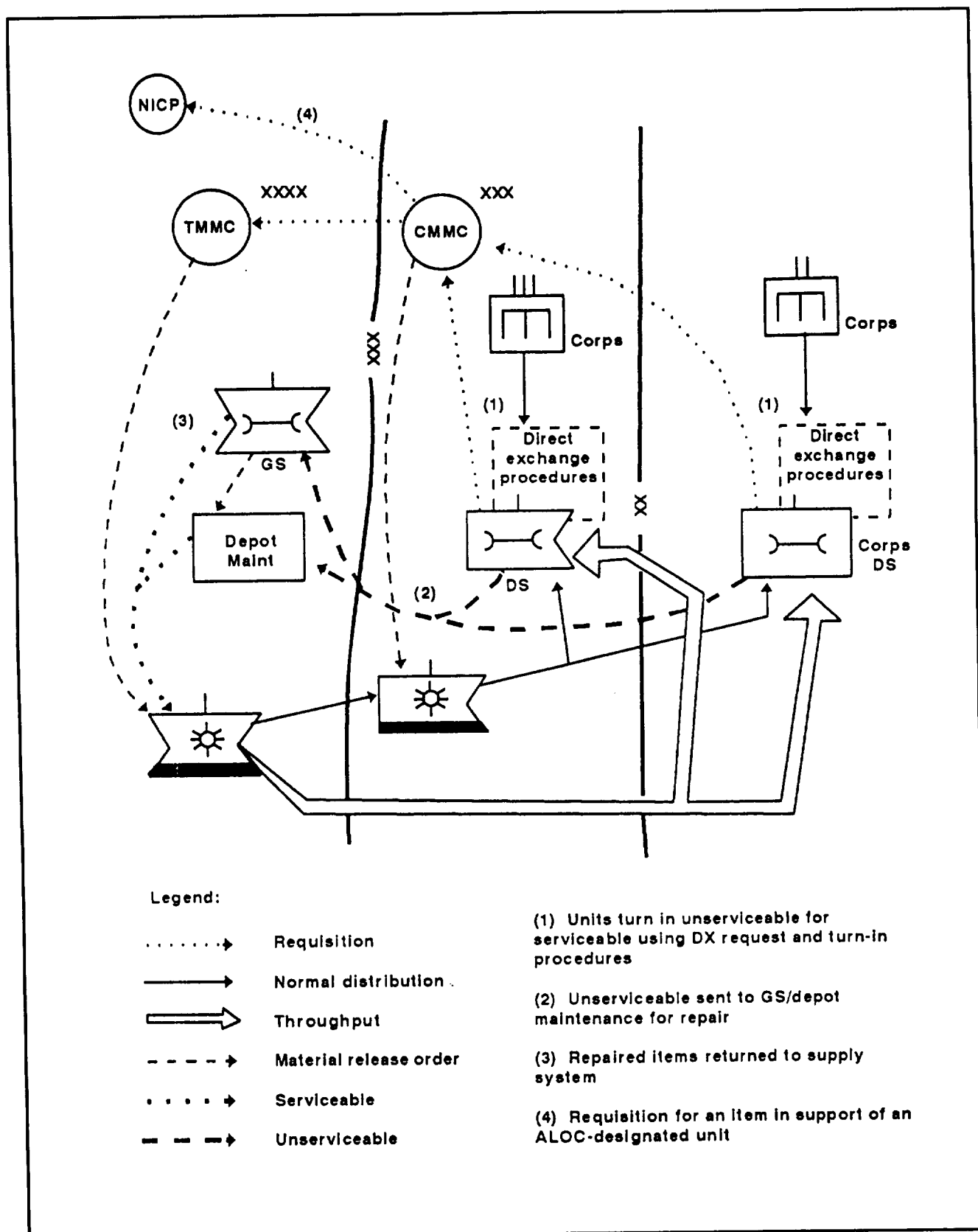


Figure 4-12. Repairable flow



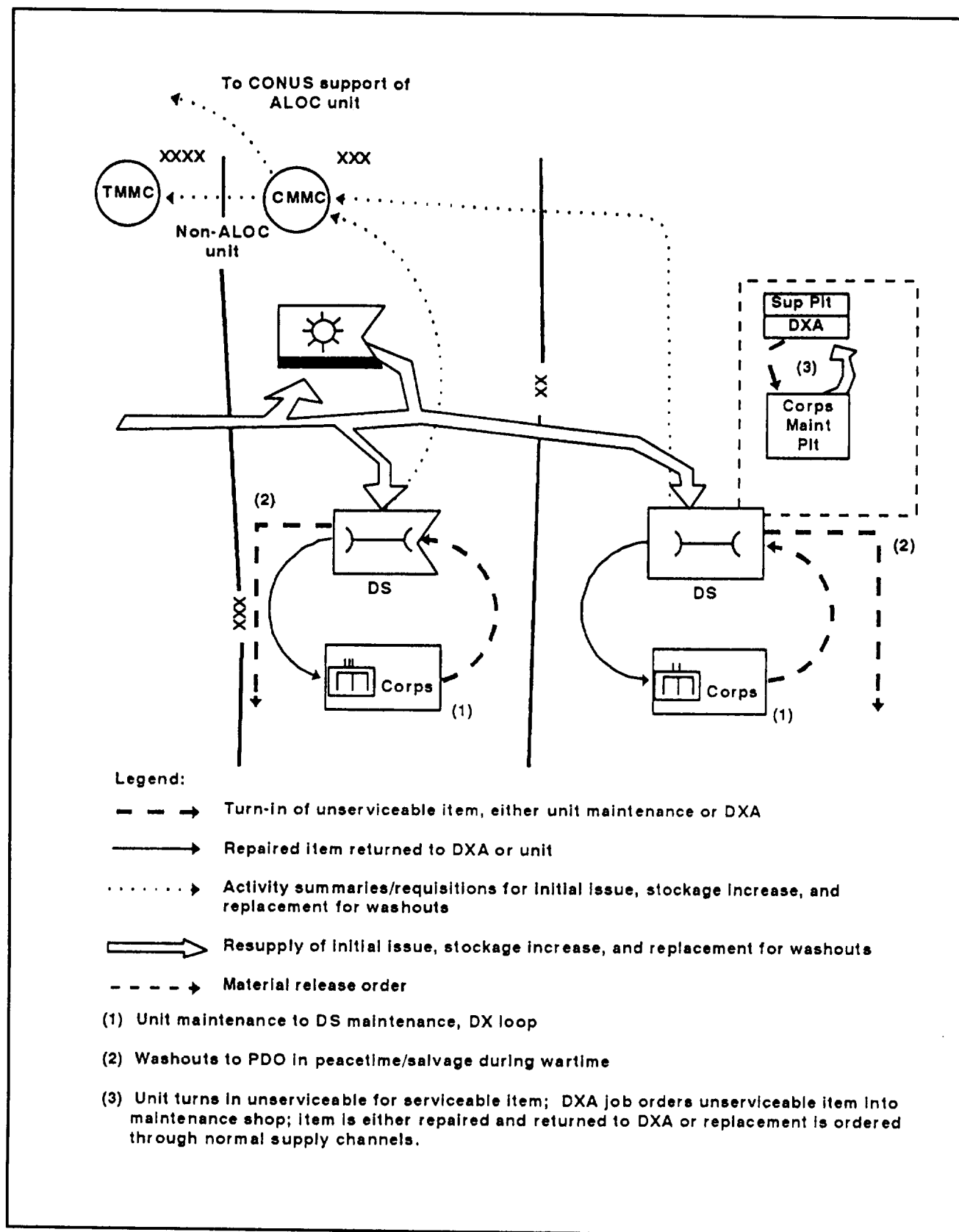


Figure 4-13. Direct-exchange flow

Site selection may be restricted based on METT-T or political and social considerations. Whenever possible, select the site to minimize engineering construction effort. Theater real estate management teams may be needed to lease the large amount of land required to support a health-services site.

Follow-on medical facility construction requirements include such things as power generation and distribution, waste disposal (hazardous and ordinary), field sanitation, water supply and distribution, heating and cooling, refrigeration, and patient and staff living facilities.

### **RECONSTITUTION SUPPORT**

Reconstitution is an extraordinary action that commanders plan and implement to restore units to a desired level of combat effectiveness commensurate with mission requirements and available resources. An operational pause may be necessary to implement reconstitution procedures. Corps engineers oftentimes do not have the opportunity to take full advantage of reconstitution because many engineer missions continue to support the reconstitution effort, including MSR maintenance and arifield upgrades. Therefore, the corps engineer commander emphasizes the need for continuous internal unit reconstitution activities throughout the battle. Chapter 7 provides more detail on corps engineer support to reconstitution operations, along with internal unit reconstitution operations.

### **LOGISTICS FORCE-PROTECTION SUPPORT**

Corps logistics forces are primarily located in rear areas and are vulnerable to rear-area

threats. The purposes of corps rear operations are to secure the force; neutralize or defeat threat operations in the rear area; and ensure freedom of action in close and deep operations. Three levels of response to threat activities are used in planning corps rear operations. Rather than focusing on the size or type of threat, these levels focus on the nature of friendly actions needed to defeat the threat.

Ž Level I threats can be defeated by base or base cluster self-defense measures.

Ž Level II threats are beyond base or base cluster self-defense capabilities but can be defeated by response forces, normally with supporting fires.

Ž Level III threats necessitate the command decision to commit a combined arms tactical combat force to defeat them.

Corps engineer construction forces build and fortify corps logistics bases, battle-command facilities, and decontamination sites. They also perform other engineer tasks needed against rear-area threats such as camouflage and countermobility operations. Corps combat engineer forces can be used to defeat level H threats if the corps commander has deemed it necessary to divert valuable engineer assets to this mission. They are generally not suitable for defeating level III threats unless they are augmented with additional training, transportation, forces, antiarmor weapon systems, and forward-observer support adequate enough to defeat the expected threat forces.

### **CORPS ENGINEER LOGISTICS CONCEPT**

Corps engineer sustainment planners and executors focus on several essential tasks to accomplish the logistics support mission. First, engineer logistics planners keep pace with the

corps decision cycle through early, complete, and continuous integration into the corps C2 and logistics structure. They plan and adjust engineer sustainment in concert with the rapid

corps planning process. Second, they track both subordinate and supporting engineer units' sustainment postures to allow the sustainment planner to account for available resources, shift them as necessary and integrate them into planning future operations. Third, detailed coordination with the corps logistics units allows engineer sustainment planners to influence current and future operations by ensuring that continuous and responsive logistics support is maintained.

### **CORPS ENGINEER LOGISTICS LAYDOWN**

Corps logistics support for engineer units depends on their location on the battlefield and their command or support relationship to the supported unit. In terms of logistics planning and integration, corps engineer units fall into four types:

- Ž Corps engineer brigade and group HHC and separate engineer companies (such as bridge and CSE companies).
- Ž Corps engineer units operating in division areas.
- Ž Corps engineer units supporting cavalry regiments and separate maneuver brigades.
- Ž Corps engineer units supporting corps rear operations.

Corps engineer brigade and group HHCs and separate companies have limited organic capability to sustain themselves. Therefore, these units rely upon tailored corps logistics assets from the COSCOM for sustainment throughout the battlefield. These engineer units locate and establish accounts with designated COSCOM logistics-support agencies and units. Corps engineer separate companies that are attached to corps engineer battalions receive logistics support through those battalions for the duration of the attachment.

Corps engineer units supporting forward maneuver brigades receive logistics support from an element of the COSCOM collocated with the brigade FSBs. These special supply and health-service-support packages from the CSG are tailored and sent to the BSAs through direct coordination with the CSG LO collocated with the DISCOM CP. The DISCOM may provide common classes of supplies to forward corps engineer units. Personnel-services support remains with corps personnel units that locate in the division support area (DSA), Corps engineer units operating in division rear areas receive supply and health-services support from the DS corps support battalion. Personnel-services support is obtained through direct coordination with corps personnel units in the DSA.

Corps engineer units supporting cavalry regiments and separate maneuver brigades receive support through the designated corps support package attached to the corps maneuver unit. Corps engineer units operating in the corps rear area receive logistics support through a designated CSG on an area basis. They locate and establish accounts with designated COSCOM logistics-support agencies and units. Theater engineer units operating in the corps rear area are also supported by a designated CSG.

Regardless of the command or support relationship and location on the battlefield, all corps engineer units provide routine logistics status reports through the appropriate headquarter to ensure that the logistics support of corps engineer units is fully integrated into the corps's planning and coordination of sustainment support.

### **FLOW OF SUPPORT**

Logistics support for corps engineer units is divided into two basic categories: unit sustainment and mission sustainment. Unit sustainment encompasses all of a unit's logistics-

support requirements needed to remain a viable fighting force. Mission sustainment consists of the supplies and services needed to accomplish specific engineer missions for the corps. The flow of supplies and services in these categories differs, requiring corps engineer logistics planners and executors to understand the differences. Figure 4-14 and Figure 4-15, page 4-30, show the flow of supplies and services for unit and mission sustainment. The requisition and delivery processes vary, based on the supply class or type of service. Engineer unit sustainment is generally accomplished through the COSCOM infrastructure of corps support battalions, personnel, and medical units. Forward corps engineer forces may also receive some common logistics support from DISCOM units. Mission sustainment requires supplies such as Class V demolitions and mines for combat operations and Class IV construction materials for general engineering missions. These supplies are requested through the COSCOM direct-support supply unit (DSSU), which in turn passes the requisition to the CMMC. These mission supplies are normally moved from corps general-support supply units (GSSUs) by corps transportation units as close to the combat or general engineering mission location as possible. This minimizes multiple material handling requirements, reduces the transportation requirements on corps transportation assets, and facilitates faster mission accomplishment. If mission-related supplies cannot be delivered directly to the combat or general engineering location or engineer unit by corps transportation assets, a plan using corps engineer or other corps assets is required. Most corps engineer units are equipped to augment this operation with limited organic transportation capability but are not responsible for planning, controlling, and executing the delivery of mission-required supplies.

Corps engineers can influence both unit and mission sustainment requirements through early integration into the corps sustainment planning process at the main and rear CPs.

Sound sustainment estimates, accurate tracking of corps engineer unit sustainment posture, and continuous coordination with the COSCOM and corps G4 ensure that engineer unit requirements are properly forecasted, prioritized, and delivered.

### **KEY CORPS ENGINEER LOGISTICS LEADERS**

The responsibilities of the corps engineer unit's key logistics leaders and their functions within the corp and engineer CP systems are crucial to accomplishing these tasks. All corps engineer commanders and staffs must be familiar with and support these roles and functions to ensure appropriate corps engineer unit and mission sustainment.

#### **Assistant Corps Engineer**

The ACE is responsible for writing and integrating engineer-specific information for inclusion in corps orders and plans, including logistics support. The ACE ensures that essential engineer logistics-support requirements are identified, coordinated, and published. He is assisted in this task by the corps rear CP engineer section, the corps engineer brigade S4, the corps main CP engineer plans and operations sections, and the corps engineer brigade CP CSS cell.

#### **Corps Rear CP Engineer**

The corps rear CP engineer is responsible for identifying requirements and ensuring that logistics are coordinated for engineer units operating in the corps area. The corps rear CP engineer is assisted in this task as necessary by the corps main CP engineer plans and operations sections and the corps engineer brigade CP CSS cell.

#### **Executive Officer**

The XO, at all levels from the corps engineer brigade through the corps engineer battalion, is responsible for synchronizing all logistics sup-

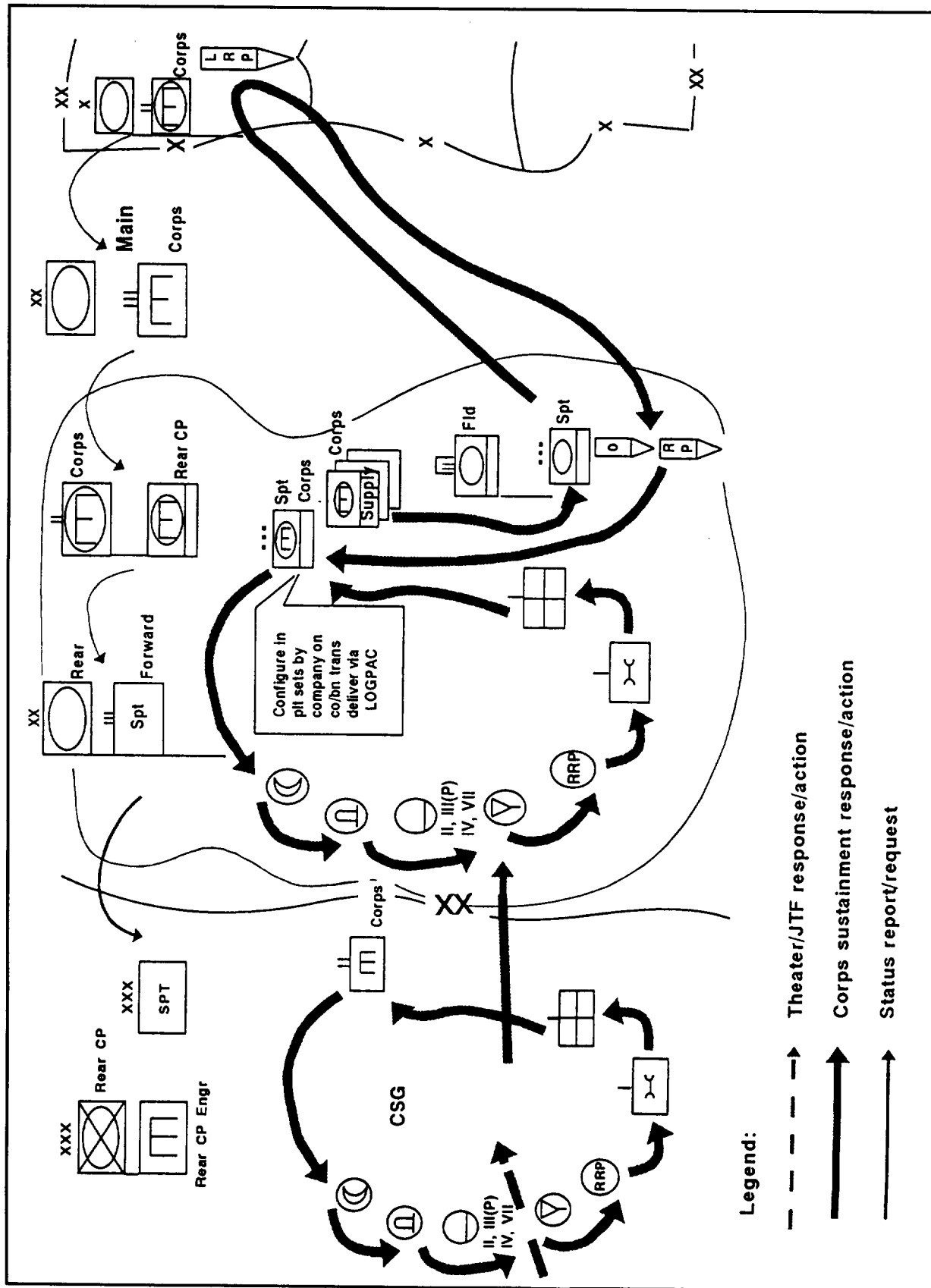
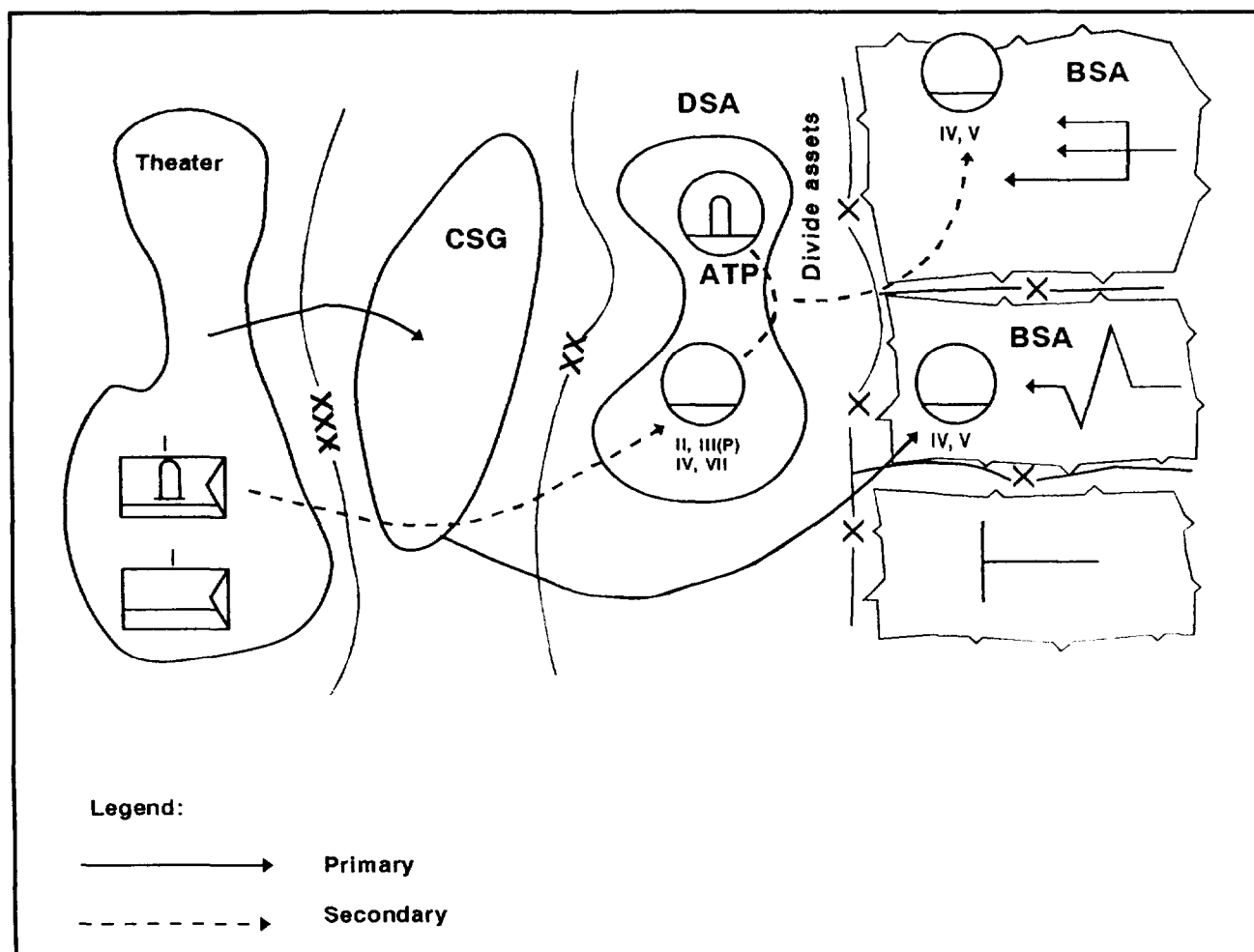


Figure 4-14. Unit sustainment for corps engineers



**Figure 4-15. Engineer mission sustainment Class IV/V supplies for corps engineers**

port in his unit. He directs the execution of engineer staff logistics-support tasks, coordinates the effort of staff members, and supervises the efficient and prompt response of staff logistics-support functions. He relies on the logistics staff section (for example, the corps engineer brigade, group CSS cells, the battalion rear CP, and unit trains elements) to plan, integrate, request, and monitor corps engineer logistics functions that support both unit and mission sustainment.

#### S1

The S1 at the corps engineer brigade, group, and battalion levels is responsible for integrating personnel and medical-services support

and general administrative functions with the appropriate corps personnel, finance, and medical-support units. The S1 should be cross-trained with the S4 in all areas of engineer sustainment.

The corps engineer brigade S1 specifically coordinates corps engineer personnel and medical support with the corps G1/AG staffs at the corps rear CP and with the corps personnel, finance, and medical groups.

#### S4

The S4 at the corps engineer brigade, group, and battalion levels is responsible for integrating supply, maintenance, transportation, and

field-services support with the appropriate corps logistics-support units. The S4 should be fully cross trained with the S1.

The corps engineer brigade S4 specifically plans, coordinates, and monitors corps engineer operations with the corps rear CP engineer, the corps rear CP G4, and the COSCOM CP staffs. He provides detailed sustainment input to the corps engineer brigade TOC for developing orders for each mission. The brigade S4 closely monitors and accurately tracks the sustainment status of corps engineer groups, battalions, and separate companies. He is assisted by a chief supply sergeant, a supply technician warrant officer, and supply specialists for supply-related functions. He is also assisted by the maintenance technician warrant officer and senior maintenance supervisor for troubleshooting maintenance operations and support.

#### **HHC Commander**

Corps engineer brigade, group, and battalion HHC commanders command the HHC CP and are assisted by the HHC 1SG. The commander is responsible for coordinating sustainment of the corps engineer brigade, group, or battalion CP and command groups. He ensures logistics coordination and integration with designated COSCOM support units. He may also be responsible for base defense operations.

#### **Company First Sergeant**

The corps engineer company 1SG is the principal logistics sustainment leader at the company level. The company 1SG remains focused on sustainment of current engineer operations and is normally located with the company CP. However, he may be located at the unit trains element, if established, or a corps CSS location. He maintains close coordination with platoon sergeants and maintenance/supply section sergeants; engineer battalion, group, or brigade S4/S1s; and any supported maneuver S4/S1s. The 1SG monitors

the status of engineer company soldiers, including their health, welfare, and morale.

### **CORPS ENGINEER LOGISTICS COMMAND AND CONTROL**

Corps engineer logistics C2 centers around the corps rear and main CPs, but pervades all corps engineer C2 nodes. Each corps engineer CP has specific responsibilities in identifying unit and mission logistics requirements, estimating resources, integrating into the corps's planning cycle, and monitoring the execution of engineer sustainment missions supporting corps logistics operations.

#### **Corps Rear CP Engineer Section**

The corps rear CP engineer section is the corps engineer's primary integrator into the corps for executing logistics support for subordinate corps engineer units. The rear CP engineer section coordinates sustainment for current corps engineer operations and plans and prepares for implementation of future operations. It maintains updated logistics status of corps engineer units, providing the corps main CP engineer section with detailed logistics estimates to assist in formulating corps plans and orders and ensuring that corps engineer sustainment plans are synchronized with the corps G4 and the COSCOM. The rear CP engineer works closely with the brigade S4 to develop future logistics estimates.

#### **Corps Main CP Engineer Section**

The corps main CP engineer section supports the ACE in developing corps engineer sustainment plans and writing the engineer logistics portions of the basic corps OPLAN or OPORD and paragraph four of the engineer annex. The ACE integrates engineer sustainment into corps operations through coordination with the corps main CP CSS cell. The corps main CP engineer section ensures that immediate engineer sustainment requests received from the corps TAC CP are forwarded

to the corps rear CP and the corps engineer brigade CSS cell.

### **Corps Tactical CP Engineer Section**

The corps TAC CP engineer section has limited capability to impact engineer logistics support. Its primary logistics duties are receiving and forwarding reports and influencing the redirection of sustainment priorities for corps engineer units operating forward in the corps area.

### **Corps Engineer Brigade and Group TOC CSS cells**

The CSS cells operating in the corps engineer brigade and group TOC fully support the brigade and group S1/S4 officers in developing corps engineer sustainment plans and writing paragraph four for brigade and group OPORDs and OPLANs. They monitor current corps engineer logistics status through periodic personnel and logistics status reports (for example, the personnel report (PERREP) and the LOGSTAT) from subordinate units. They recommend logistics priorities to the brigade or group commander; identify critical personnel and supply shortages, along with maintenance or transportation problems, that affect engineer unit and mission sustainment; and redirect logistics support as required. The corps engineer brigade CSS cell maintains constant communication with subordinate engineer units logistics sections, the corps rear CP engineer section, COSCOM CP, and the corps G4. The corps engineer group CSS cell maintains constant communication with the brigade CSS cell, subordinate corps engineer units, and supporting maneuver unit logistics-support units, if required.

### **Corps Engineer Brigade and Group HHC CPs**

The corps engineer brigade and group HHC establish CPs at or in close proximity to the brigade or group TOC. The HHC CP is responsible for the sustainment of the brigade and group CP. This includes establishing accounts

with designated COSCOM support units, setting up life-support areas for CP personnel, and locating vehicle maintenance areas. The HHC CP may also be designated as a BDOC or BCOC.

### **Corps Engineer Battalion Rear CP**

The corps engineer battalion rear CP fully supports the battalion S1/S4 officers in developing corps engineer battalion sustainment plans and writing paragraph four for battalion OPORDs and OPLANs. They monitor current corps engineer battalion logistics status through periodic personnel and logistics status reports (for example, the PERREP and the LOGSTAT) from subordinate units. They recommend logistics priorities to the battalion commander; identify critical personnel and supply shortages, along with maintenance or transportation problems, that affect engineer unit and mission sustainment; and redirect logistics support as required. The corps engineer battalion rear CP maintains constant communication with the battalion main CP, subordinate engineer units logistics sections, higher headquarters logistics sections, designated COSCOM support units, and supporting maneuver unit logistics-support units, if required.

### **Corps Engineer Unit Trains Element**

Corps engineer companies may form a unit trains element to control engineer logistics support from the corps or to establish an engineer equipment park or construction supply point. The unit trains element is normally collocated with the company CP. However, depending on METT-T, the unit trains element may be formed in the vicinity of a COSCOM supply or maintenance point or with a corps engineer battalion rear CP. The unit trains element is normally under the control of the company 1SG and consists of the company supply and maintenance sections. It tracks, reports, and provides critical engineer unit and mission-sustainment support. The corps engineer unit trains element maintains constant communication with subordinate platoon and section ser-



geants, higher headquarters logistics sections, designated COSCOM support units, and supporting maneuver unit logistics-support units, if required.

### **THE CORPS ENGINEER'S ROLE IN PLANNING AND COORDINATING LOGISTICS**

The corps engineer's attempt to plan and coordinate engineer logistics efforts is essential to full integration of corps engineer units into the corps's sustainment structure. The ACE, the corps rear CP engineer, the COSCOM, and the G4 work closely to synchronize the logistics planning and coordination process. They facilitate sound and timely plans or orders and necessary sustainment for corps engineer units.

Upon receipt of a WARNORD for a mission, the corps rear CP engineer immediately initiates an engineer logistics estimate as outlined in FM 101-10-1/2. This estimate is specifically focused on the sustainment of all subordinate corps engineer units, Classes I, III, IV, V, and VII supplies and personnel losses are the essential elements in the logistics estimate process. Close integration with the COSCOM can simplify and speed the estimate process through the use of their automated data processing (ADP) systems. During continuous operations, the estimate process may need to be abbreviated due to time constraints. While working closely with the corps engineer brigade TOC CSS cell, the corps rear CP engineer aggressively maintains an accurate logistics and combat status of all engineer units. This information is critical to shortening the engineer logistics estimate process.

Having conducted the estimate process in determine unit sustainment and mission supply requirements, the corps rear CP engineer compares the requirements with the reported status of subordinate units to determine specific amounts of supplies needed to support the operation. These requirements are then coordinated with the COSCOM to ensure that nec-

essary supplies are identified and resourced through corps or theater stocks.

Simultaneously the ACE, the corps main CP engineer section, and the brigade TOC CSS cell develop a RSR to support corps engineer mission requirements and forwards it to the corps rear CP engineer. Based on the corps's current stockage of required items and the identification of additional supplies needed, the corps rear CP engineer, in coordination with the G4, assesses the availability of these supplies in corps' stocks. The corps rear CP engineer and the G4 also analyze the corps's capability to transport mission supplies to corps engineer units. This information is provided to the corps G3 for his development of the CSR for engineer supplies.

Having identified the requirements for both unit sustainment and mission supplies and their availability, the requirements are forwarded to the ACE at the corps main CP, along with a projected combat-power status based on the current engineer sustainment status. The ACE then analyzes the requirements to support the plan and translates them into specific plans that are used to determine the supportability of the corps's courses of action. Upon determination of a course of action, the specific engineer logistics input into the corps's basic order and paragraph four of the engineer annex are developed and incorporated into each. Current engineer sustainment operations may require redirection based on the new plan and are sent to the corps rear CP engineer and the corps engineer brigade TOC CSS cell for coordination and execution.

Corps engineer units operating in division areas provide the unit and mission logistics status to the division engineer staff so that they can do a similar logistics staff planning process. Accurate and timely status reporting assists the division engineer in providing an accurate corps engineer unit status to the division commander and energizes the division engineer staff support to intercede in critical sustain-

ment problems when necessary. The division engineer staff also ensures that mission-required supplies needed by corps engineer units to execute division missions are integrated into the division's logistics plans.

Theater engineer units operating in the corps area provide the unit and mission logistics status to the corps engineer staff, normally the corps rear CP engineer. This allows a similar logistics staff planning process. Again, accu-

rate and timely status reporting assists the corps engineer in providing an accurate theater engineer unit status to the corps commander and energizes the corps engineer staff support to intercede in critical sustainment problems when necessary. The corps engineer staff also ensures that mission-required supplies needed by theater engineer units to execute corps missions are integrated into the corps's logistics plans.