

CHAPTER 1

CORPS ENGINEER OPERATIONS

The objectives of the carpet-bombing effort in front of the VII Corps were to mask the assault and saturate enemy defensive sectors as far back as their direct-support artillery positions. Following the bombing, the 1st, 9th, and 30th Infantry divisions were to deliver a coordinated assault across a relatively narrow front and punch a hole through which the waiting 2nd and 3rd Armored divisions would launch a pursuit of the presumably routed German forces.

The 1106th Engineer Combat Group was moved up to the VII Corps' left flank to support directly the 30th Infantry Division and the initially trailing 2nd Armored Division as they advanced along high ground on the west bank of the Vire River. On the VII Corps right flank, the 1120th Engineer Combat Group would support the 4th and 9th Infantry divisions in the assault and the follow-on 3rd Armored Division in the pursuit. Our own 1111th Engineer Combat Group would act as the corps engineers in the VII Corps sector, devoting its efforts to opening and maintaining the supply routes and building and maintaining the longer, more permanent timber trestle bridges back along the MSR that would be opened by the advancing infantry and armor and initially cleared by the direct-support engineer combat battalions.

A description of Army breakout plans from the Normandy lodgment in July 1944. From the book, The First Across the Rhine, The Story of the 291st Engineer Combat Battalion, by Colonel David E. Pergrin with Eric Hammel.

THE ROLE OF CORPS ENGINEER FORCES

THE CORPS

The corps is the US Army unit capable of operating at both the tactical and operational levels of war. It is the instrument by which higher echelons of command conduct maneuvers at the operational level. Corps are tailored based on mission, enemy, terrain, troops, and time available (METT-T) to contain all combat, combat support (CS), and combat service support (CSS) unit capabilities required to sustain op-

erations for a considerable period. During force-projection operations, an Army corps may serve as the Army forces (ARFOR) headquarters to a theater command or joint task force (JTF) or as a JTF headquarters itself. The corps may control units from the Air Force, Navy, and Marine Corps, along with allied and coalition nations. A tailored corps engineer brigade is commonly available to the corps to weight its main effort and to perform special CS functions.

THE CORPS ENGINEER BRIGADE

The corps engineer brigade commands and controls all engineer support to the corps and is assigned all engineer units that are not organic to divisions, separate maneuver brigades, and cavalry regiments. The brigade provides mobility countermobility survivability, and general engineering support to the corps based on METT-T. Corps topographic engineering support normally is provided by a topographic engineer company placed indirect support (DS) to the corps from the theater Army (TA) topographic engineer battalion. The corps engineer brigade augments engineers organic to divisions, separate maneuver brigades, and cavalry regiments.

The corps engineer brigade may contain various numbers of engineer groups, corps engineer battalions (mechanized, wheeled, airborne, and light), combat heavy engineer battalions, and separate engineer companies (fixed and assault float bridge, combat support equipment (CSE), light equipment (LE), and topographic). Other specialized engineer organizations will augment the corps engineer effort as the mission dictates. The brigade controls and staff supervises theater engineer forces from EAC operating in the corps area. These may include units such as prime-power battalions; construction support, pipeline construction, dump truck and port construction companies; and utilities, well-drilling, fire-fighting, and other special teams and detachments.

The corps engineer brigade commander also serves as the corps engineer special staff officer. The corps staff engineer section (SES) assists him by providing engineer functional-area expertise to all corps staff elements. The SES provides recommendations to the corps staff on the use of engineer assets and ensures that the engineer battlefield functions are fully planned, integrated, synchronized, and executed to support the corps commander's intent and scheme of maneuver. The corps engineer

also tasks and prioritizes the work effort of the DS corps topographic company.

In force-projection theaters where no forward-based theater engineer structure exists, the corps engineer brigade could initially function as the theater engineer headquarters and regional contingency engineering manager (RCEM). To do this, the brigade needs special augmentation from an engineer command (ENCOM) and/or the USACE in the areas of construction management, real estate acquisition, and construction contracting support. The brigade would execute this function until an ENCOM, TA engineer brigade, or engineer construction group arrives in theater.

In the absence of follow-on deployment of an ENCOM, TA engineer brigade, or engineer construction group, the corps engineer brigade (with the special augmentation listed above) may have to act as the theater engineer headquarters indefinitely.

SIMULTANEOUS OPERATIONS

Simultaneous deep, close, and rear corps operations comprise a special and continuous battle space synchronization requirement. The linkage between these operations assures that the aims, timing, and activities associated with these operations are mutually supporting. For commanders, synchronization of simultaneous operations will normally require deliberate planning and staff coordination. Simultaneous operations in depth have a direct impact on the enemy's cohesion. Corps units are no longer restricted to fighting three sequential operations (deep, close, and rear). Nor are in-depth operations conducted solely to establish favorable conditions for the close fight. The corps commander influences these operations by assigning on-order missions and priorities and allocating combat assets. He must describe, in his concept of the operation, how all deep, close, and rear operations will be executed simultaneously, their command relationships, and their relative priorities. The

corps commander will retain reserve forces under his control. The command echelon above corps designates the corps's area of operations (AO). The corps geographically divides its AO into subareas where it will conduct close, deep, and rear operations. The use of lateral, rear, and forward boundaries is intended to better delineate responsibility and commandant control (C2). However, combat operations in the corps area may be nonlinear, and the intermingling of opposing forces may be inevitable. The air and space above the corps's AO constitute a third dimension of the corps's battle space.

Corps engineers support operations throughout the corps's battle space based on the corps commander's intent and METT-T. Engineer support to all corps deep, close, and rear operations focuses on planning, coordination, synchronization, integration, and resource allocation. Successful engineer operations in support of corps operations require a thorough understanding of the terrain, threat capabilities, commander's intent and scheme of maneuver.

Deep Operations

Deep operations allow the corps commander to engage the enemy throughout the depth of the enemy's AO so that the effects appear to the enemy commander as one fight. The corps conducts deep operations to destroy the enemy's cohesion, nullify his firepower, disrupt his C2, destroy his supplies, break his morale, or disrupt his introduction of follow-on forces. Firepower, both lethal and nonlethal, synergistically combines with maneuver in conducting deep operations.

The corps uses a Decide-Detect-Track-Deliver Assess approach that enables the commander to take the initiative in selecting high-value targets (HVTs) before they actually present themselves in the target array.

The Decide phase provides the focus and priorities for the collection-management and fire-planning processes. During the Decide

phase of deep operations, engineers provide terrain analysis that supports the identification of named areas of interest (NAIs) and target areas of interest (TAIs). Countermobility targets are recommended for nomination by corps staff engineers to the corps Assistant Chief of Staff, G2 (Intelligence) (G2)/Assistant Chief of Staff, G3 (Operations and Plans) (G3) deep operations coordination cell and the corps's joint targeting board. Recommended targets for nomination could include the emplacement of long-range scatterable minefield and the destruction of bridges and other choke points. The use of deep countermobility emplacement systems, such as the Gator, needs to be planned and coordinated at least 72 hours prior to delivery time.

The Detect phase executes the decisions reached in the Decide phase. When target selection standards have been defined, a decision support template (DST) is prepared. When an acceptable target is located, evaluation of the DST may result in an immediate fire mission.

The Track phase occurs when the target is out of range of corps fire-support systems or when future intentions need to be determined. Tracking is accomplished with various national, theater, and corps intelligence and surveillance systems.

The Deliver phase is executed rapidly by having designated fire-support systems respond to corps attack directives when the defined trigger events are detected by sensors.

During the Assess phase, a timely and accurate estimate of the damage resulting from the application of military force, either lethal or nonlethal, against the target is made.

During the Decide, Detect, Track, Deliver, and Assess phases, corps engineers coordinate, integrate, track, and assess the effectiveness of all countermobility systems used in deep operations. Task-organized corps engineers support deep ground-maneuver mobility by participating in reconnaissance op-

erations and by keeping open the ground routes, drop zones, landing zones, and other means of access needed by deep forces to sustain the fight.

Close Operations

Corps close operations include the simultaneous close, deep, and rear operations of committed divisions, separate maneuver brigades, and cavalry regiments. The outcome of corps close operations will ultimately determine the success or failure of the corps's battle.

The corps engineer brigade augments organic engineers in divisions, separate brigades, and cavalry regiments. Engineer groups, corps engineer battalions, combat heavy engineer battalions, engineer bridge companies, and engineer CSE and LE companies can be task-organized to support maneuver elements according to the corps commander's intent to weight the main effort. Corps engineers may also work in the division area on a task or area basis, such as constructing and repairing main supply routes (MSRs) from corps support group areas to the brigade rear boundary; constructing float and fixed bridging, emplacing corps-directed obstacles; constructing forward corps airfields and aviation support facilities; or providing survivability support for battle command nodes, field artillery, air defense artillery (ADA), and logistics support sites. All corps engineers operating in a division's area will be under the division engineer's control and staff supervision. A corps engineer work line (EWL) may be designated to divide division and corps engineer responsibilities. Corps engineers also support separate corps brigades, such as artillery aviation, air defense, military police (MP), military intelligence (MI), signal, and chemical brigades, in much the same manner. Major corps combined arms mobility operations, such as large-scale obstacle breaching and river crossings, are supported primarily by corps engineer units.

Topographic engineering support to corps close operations focuses on augmenting division ter-

rain-analysis teams when division requirements exceed organic capabilities. In preparation for close operations, topographic engineers support the corps G2 with weather and terrain analyses and terrain products that assist in the intelligence preparation of the battlefield (IPB) process. In addition, the DS topographic engineer company produces detailed, large-scale imagery products and other special products depicting areas where combat operations will be conducted. The topographic company survey team provides accurate geodetic survey control points for artillery, aviation, intelligence, and signal positioning.

Mobility support for corps close operations focuses on the movement of large tactical units from the corps rear to the brigade rear boundary. Topographic engineers identify possible mobility corridors. Corps engineer battalions widen lanes through minefields and other obstacles breached by assaulting division engineers, breach obstacles that have been bypassed by assault forces, upgrade combat roads and trails, and keep open key routes designated by the corps G3. Corps engineer bridge companies provide assault float bridging and follow-on fixed bridging support. Corps engineer battalions, along with CSE and LE companies, repair battle-damaged roads and airfields. This repair includes forward aviation combat engineering (FACE) support such as constructing low-altitude parachute extraction zones (LAPES) and forward area rearm/refuel points (FARPs).

Countermobility support for corps close operations focuses on reinforcing terrain with obstacles that support the corps commander's intent and maneuver plan. Corps terrain analysts identify threat-sized regimental attack corridors. The corps obstacle plan degrades the enemy's ability to maneuver without hindering the maneuver of friendly divisions, separate brigades, and cavalry regiments. The corps commander will designate obstacle-restricted areas (ORAs), corps reserve forces' counterattack routes, any corps reserve demolition obstacles within the corps sector, and specific terrain

features that must be protected for ongoing and future corps operations such as key MSR bridges. Corps engineer units augment the execution of the corps obstacle plan with division, separate brigade, and cavalry regiment engineers. Corps logistic planners anticipate and push Class IV/V obstacle packages (including mines and demolitions) forward to emplacing corps engineers as soon as mission requirements are known.

Survivability support during corps close operations emphasizes the use of corps engineer battalions and attached engineer CSE and LE companies to protect critical corps communication nodes, command posts (CPs), logistics units, corps artillery fire-direction centers, and ADA. Corps engineer units also construct protective berms and revetments for corps aviation units and nuclear, biological, chemical (NBC) collective protective shelters for critical corps units.

General engineering support to corps close operations concentrates on lines of communication (LOC) and MSR construction, maintenance, and rehabilitation in the corps's AO by corps engineer battalions and attached CSE and LE companies. Combat heavy engineer battalions may also be attached to the corps engineer brigade to perform vertical and horizontal construction missions. This includes the maintenance and repair of airfields for unmanned airborne vehicles (UAVs) as well as Army aviation, Air Force, and Marine aircraft. Corps engineers will also develop logistics support areas (LSAs) that include terminal transfer points (TTPs), Class III fuel storage and transfer sites, Class V ammunition supply points (ASPS), enemy prisoner-of-war (EPW) camps, hospital sites, and troop bed-down facilities such as Force Provider.

Rear Operations

Corps rear operations are the activities conducted from the corps rear boundary to the rear boundaries of committed maneuver units. Rear operations are conducted to ensure the corps's freedom of maneuver and continuity of

operations, including sustainment and C2. The corps must synchronize the rear operations' functions of terrain management, security, sustainment, and movement with their close and deep operations, in accord with the corps commander's concept and intent.

In support of terrain management, corps engineers conduct terrain analysis to assist in the positioning of corps reserve, CS, and CSS units. The corps engineer coordinates closely with the rear tactical operations center (RTOC) to identify rear security operations and engineer support requirements. Corps engineers with combat capability (wheeled, mechanized, airborne, or light) are normally positioned in the rear area where they can control key terrain or improve the defensive capability of key bases and base clusters within the corps area. Corps engineers provide general engineering support to keep LOC open by building, maintaining, and repairing roads and airfields. Corps engineers also provide construction support for the corps support command (COSCOM) and corps aviation brigade facilities in rear areas. They coordinate with other theater engineer units and the host nation to keep railroads, waterways, and other transportation systems open and to provide necessary utility services in the corps area. Corps engineers plan and execute counter-mobility missions to block critical threat avenues of approach and to deny facilities in support of base and base-cluster self-defense plans. Rear survivability tasks include hardening C2 headquarters and digging in critical CSS facilities. Corps engineers assist in the preparation of area damage control (ADC) plans to facilitate the return of a base or base clusters to mission capability during or after hostile action or natural disasters. This is done by reducing the probability of damage, minimizing its effects, and aiding in the continuation or reestablishment of normal operations. Corps engineers provide mobility support for movement of MP and designated tactical combat forces (TCFs), including breaching and bridging support. Corps engineers with combat capability can also serve as a TCF with additional training augmented by indirect-fire support heavy weapons, communications, and transportation equipment.

CORPS BATTLEFIELD OPERATING SYSTEMS

Corps are the link between the operational and tactical levels of war. They plan and conduct major operations and battles. They create and maintain the conditions for the success of current battles and set up the conditions for the success of future battles. Operational planning concentrates on the design of campaigns and major operations. Tactical operations consist of conducting battles and engagements as parts of campaigns and major operations. The planning and execution of tactical-level battles are the corps' major roles. When conducting operations, the corps will synchronize and integrate operational- and tactical-level operating systems.

The corps engineer brigade is responsible for planning, coordinating, synchronizing, and integrating the five engineer battlefield functions of mobility countermobility, survivability, general engineering, and topographic engineering into each operational- and tactical-level operating system.

Operational Intelligence

Operational intelligence is that intelligence which is required for planning and conducting major operations within a theater of operations (TO). At the operational level of war, the joint and multinational intelligence system concentrates on the collection and analysis of information that will lead to the identification, location, and analysis of the operational center of gravity and operational objectives. Operational intelligence also focuses on production efforts downward and concentrates efforts on fighting priority intelligence requirements (PIR) such as—

- Basic (or finished) intelligence.
- Strategic indications and warning.
- Tactical warning.
- Current intelligence reporting.

- IPB on an operational or theater basis.
 - Targeting intelligence.
 - Battle damage assessment and post-strike assessment.
- Collection requirements management (synchronization of intelligence product reports).

The corps engineer is critical to this process in the areas of collecting and processing operational information. He is the corps expert on threat breaching, bridging, and obstacle emplacement capabilities. He is responsible for advising the corps commander on the effective use of terrain. He coordinates with the corps G2/G3 for the collection of battlefield terrain information through reconnaissance and other collection sources such as satellite imagery. He coordinates with the theater engineer for corps topographic support requirements for surveying, terrain analysis, and reproduction. He assists in the distribution of terrain-analysis and other special topographic products and he defines the geometry of the battlefield by providing map products and geodetic surveys. The corps engineer evaluates the availability of standard and nonstandard maps and terrain-analysis data bases covering the corps's AO. If shortfalls exist, he and the corps G2 define specific requirements and coordinate the collection and creation of necessary data to build the corps topographic data base. The corps engineer prepares the topographic operations annex (Appendix A) for corps operations plans and orders. In coordination with the corps G2, he tasks and prioritizes the DS corps topographic company's work effort. The corps topographic company uses cartographic techniques to produce image- and map-based special-purpose products. These products include intelligence and operations overlays or overprints, modified combined obstacle overlays (MCOOs), image maps, expedient map revisions, line-of-sight (LOS) products, and precise survey and geodetic positions. The corps engineer also determines the need for a topographic survey to verify data used by military intelligence and fire-support systems. The corps engineer coor-

dinates the DS of one corps terrain-analysis team from the corps topographic company to the corps G2/G3 at the corps analysis control element (ACE). This terrain-analysis team provides the corps G2/G3 with ongoing analyses of the effects of terrain and weather on combat operations as an integral part of the continuous IPB process. A second corps terrain-analysis team from the corps topographic company provides general support (GS) to other subordinate corps headquarters under the corps engineer's staff supervision.

Operational Movement and Maneuver

Operational movement and maneuver is the disposition of joint and/or multinational forces to create a decisive impact on the conduct of a campaign or major operation. This is accomplished by either securing the operational advantages of position before the battle is joined or by exploiting tactical success to achieve operational or strategic results. The corps maneuver elements are its divisions, separate maneuver brigades, cavalry regiment, and aviation brigade. The objective of operational maneuver at corps level is to place or move brigade- or division-sized combat elements into positions where they can bring fires to bear on the enemy with the greatest effect.

The corps engineer synchronizes operational movement and maneuver with operational mobility and countermobility support. He plans the use of corps engineer forces in overcoming operationally significant obstacles, such as those created by nuclear or chemical weapons, and enhancing the movement of friendly forces. He also selects locations for operational obstacle systems and plans for their emplacement by corps engineer forces. Corps engineers augment engineers organic to the maneuver elements. Corps engineers can be task-organized to support maneuver organizations for relatively long-term, continuous support or on a short-term, task basis such as breaching major complex obstacles, crossing rivers, or emplacing corps-directed obstacles. In support of operational movement and maneuver, the

corps engineer provides advice on the employment of all scatterable mines in the corps area regardless of the means of delivery. The use of scatterable mines gives the corps the ability to quickly place an obstacle in the face of the enemy in order to fix, turn, disrupt, or block his advance or withdrawal. The corps carefully monitors scatterable-mine emplacement and self-destruct times to be able to attack rapidly through a recently created gap in the friendly obstacle system. The corps commander is the approval authority for the employment of all scatterable mines in the corps area. The authority to emplace mines with long self-destruct times (greater than 24 hours) may be delegated down to division level and with the concurrence of corps, down to brigade level. The authority to emplace mines with short self-destruct times (less than 24 hours) may be delegated as far down as battalion level. The corps commander should allocate the authority to emplace scatterable mines based on both the duration and type of weapon system deploying the mines. The corps engineer ensures that the use of scatterable mines is well coordinated so that a lower echelon does not inadvertently place an obstacle in the path of a future corps maneuver corridor (for example, a corps reserve force's counterattack route).

Operational Fires

Operational fires are the application of firepower and other means to achieve a decisive impact on the conduct of a campaign or major operation. Operational fires are, by their nature, joint (and potentially multinational) activities. They are a vital component of the operational plan, and as such, must be carefully integrated with the commander's operational concept. Operational maneuver and operational fires may occur simultaneously within a commander's battle space but may have very different objectives. An example is simultaneous attacks, where neither function is directly dependent on the success of the other. The Army has significant capabilities for contributing to the joint deep fight or for planning and

conducting its own deep operations, when necessary, using operational maneuver and/or organic operational fires.

Corps engineer operations and corps operational fires are closely linked and mutually supportive. The effectiveness of this link is assured by accurate topographic geodetic control points that define a common grid. These points are placed by surveyors from the DS topographic engineer company using precise geodetic survey techniques. Corps engineers also provide map-based terrain visualization products to support the corps's fire-support plan. Integrating operational fires with obstacles greatly enhances the effectiveness of both. The corps engineer assists with the target identification process, ensuring that corps obstacle planning and operational fires mutually support the commander's intent. The corps engineer provides advice and coordinates the employment and allocation of scatterable mines delivered by field artillery aviation, and tactical air into the corps area.

Operational Protection

Operational protection conserves the force's fighting potential so that it can be applied at the decisive time and place. It includes actions taken to counter the enemy's firepower and maneuver by making soldiers, systems, and operational formations difficult to locate, strike, and destroy. Operational protection pertains to forces everywhere in the theater of war or operations. Operational protection includes such items as providing operational air defense, conducting deception, safeguarding operational forces in major operations, recording all minefield locations, employing operations security (OPSEC), and providing security (including combatting terrorism).

Conducting risk assessments is integral to force protection. Risk assessments identify hazards and examine the resulting risks associated with the mission. Special risk considerations must be made where there is a threat

of weapons of mass destruction. Risk assessment is dynamic. As circumstances change and the command's experience level increases, risk assessments confirm critical information that affects decisions.

Corps engineers support operational protection by—

- Tracking minefield and unexploded ordnance (UXO) concentrations.
- Preparing operationally significant fortifications.
- Removing operationally significant hazards (including NBC).
- Providing protection for operational logistics sites.
- Providing advice and assisting units in the employment of camouflage concealment techniques.
- Supporting deception operations as required.

Operational Command and Control

Operational C2 is the exercise of authority and direction by a commander to accomplish operational objectives. The control mechanisms support the battle command exercise. The commander's vision and his stated intent guide the organization toward accomplishing their mission or assigned tasks. Battle command focuses efforts, establishes limits, and provides structure to operational functions. The C2 system supports the organization in conducting current operations while planning and preparing for future operations.

Corps engineers support the corps C2 process in various ways. Engineer participation in corps-level planning ensures that the five engineer battlefield missions are properly synchronized and integrated with all corps and JTF

operations. Engineers are incorporated into the corps' staffs at the corps' assault, tactical, main, and rear CPs. The corps engineer staff may provide manning for a JTF engineer staff. Timely production and dissemination of supporting topographic products that depict the terrain, the enemy situation, and the friendly plan ensure that all CPs are operating in the same geodetic framework.

Operational Logistics

Operational logistics consist of those activities required to support the force during campaigns and major operations within a TO. Operational support of the force extends from TO logistics bases to forward CSS units and facilities. The TO logistics base links strategic sustainment to tactical CSS. The primary focus of operational logistics is on reception, positioning of facilities, material management, movement control, distribution management, reconstitution, and redeployment.

The corps engineer assists in establishing and maintaining the corps infrastructure necessary to sustain these missions in coordination with the corps Assistant Chief of Staff, G4 (Logistics) (G4), COSCOM, TA, and foreign/host nation. This includes initial base-development planning that identifies requirements for logistics support and troop bed-down facilities. The corps engineer identifies supporting general engineering requirements and capabilities needed. Based on the corps plan, the corps engineer identifies any significant requirements of bridging, additional construction equipment, Class IV construction materials, and Class V demolitions and mines to corps logistics planners. The corps engineer closely monitors the status of these types of supplies and equipment, ensuring availability to corps operations. The corps engineer, in coordination with the corps G2, also defines stockage requirements for maps to be held by topographic units and quartermaster map distribution units supporting the corps. This service is provided through supporting CSS units, supply point storage, and the distribution of standard topographic products at the corps level.

Tactical Intelligence

Tactical intelligence is that knowledge of the enemy, weather, and geographical features required by the commander in planning and conducting combat operations. It is derived from an analysis of information on the enemy's capabilities, intentions, and vulnerabilities and the environment.

Corps engineers support tactical intelligence operations by collecting and forwarding reconnaissance information concerning friendly obstacle locations, enemy obstacles, routes, bridges, and engineer construction material. Attached corps engineer support to maneuver units engaged in intelligence-gathering missions also contributes to the corps intelligence effort. Corps topographic terrain imagery products that identify specific terrain details are provided to assist in the movement of unit personnel and equipment the emplacement of obstacles, and the siting and protection of weapons systems.

Tactical Maneuver

Tactical; maneuver is the employment of forces on the battlefield through movement and direct fires in combination with fire support, or fire potential, to achieve a position of advantage in order to accomplish the mission. This includes direct-fire systems such as small arms, tank guns, and attack helicopter fires.

Corps engineer support to tactical maneuver operations can be described in terms of augmenting engineers organic to divisions, separate brigades, and cavalry regiments that are engaged in heavy or light maneuvers, cavalry, or aviation operations. Corps engineers support heavy maneuver force operations primarily in the areas of float- and fixed-bridging support; construction repair, and maintenance of movement routes during the offense; and survivability and countermobility support during deliberate defenses. Light maneuver force operations normally need extensive augmentation from corps engineer units due to limited numbers of organic engineers in light maneu-

ver units. Critical corps engineer tasks supporting offensive light maneuver operations include opening captured airfields and lodgment facilities with heavy equipment and conducting breaching operations during the offense. All light maneuver operations normally require extensive survivability support from corps engineers. Both hasty and deliberate defensive operations require corps engineer augmentation. Task-organized corps engineer battalions normally augment cavalry regiments by providing the necessary mobility, counter-mobility, and survivability support. Corps engineers are fully embedded with regimental reconnaissance operations, providing critical terrain and obstacle information to corps intelligence agencies. Corps engineer support to corps aviation maneuver operations includes coordinating and assisting the emplacement of scatterable mines by helicopters and fixed-wing aircraft to block enemy penetrations, turn enemy formations, or protect the flanks of corps counterattacks. Corps engineers also provide general engineering support such as erecting corps aviation logistics and maintenance facilities and constructing helicopter landing pads and FARPs.

Tactical Mobility and Survivability

Tactical mobility and survivability is the capability of the force that permits freedom of movement, relative to the enemy, while retaining the ability to fulfill the primary mission. It also includes those measures the force takes to remain viable and functional by protecting itself from the effects of enemy weapons systems and natural occurrences.

Corps engineers are major contributors to this component. Corps engineers enhance the effectiveness of maneuver units by providing mobility support, degrading the enemy's ability to move on the battlefield through countermobility support, providing protective emplacements and structures, and constructing and maintaining combat trails.

Tactical Fire Support

Tactical fire support is the collective and coordinated use of target acquisition data, indirect fire weapons, armed aircraft and other lethal and nonlethal means against ground targets in support of maneuver force operations.

Corps engineer support for tactical fire-support operations can be described in terms of field artillery, electronic jamming, Army aviation, and tactical air support. The corps artillery brigade has no organic engineer assets, so it may require corps engineer support in all five engineer battlefield functions. This support may include digging in fire-direction centers, building protective berms, and breaching scatterable minefield. Topographic surveyors work closely with the corps artillery survey planning and coordination element (SPCE) to ensure that target acquisition/collection assets are on a common grid with the delivery assets to effectively respond to HVTs. In support of electronic jamming missions, corps engineers dig in the corps electronic warfare units and topographic engineers provide accurate survey control points for electronic warfare assets. Corps engineers construct protective berms, landing pads, and maintenance structures for Army aviation assets, along with FARPs. Corps engineers support tactical air missions by providing general engineering support in the areas of rapid runway repair and other maintenance of airfields and FARPs.

Tactical Air Defense

Tactical air defense includes all measures designed to nullify or reduce the effectiveness of an attack by hostile aircraft and guided missiles, both before and after they are airborne, to preserve combat power and maintain friendly freedom of action. Portions of the corps ADA brigade will be task-organized to the maneuver elements, as dictated by METT-T to support close operations. The remainder of the ADA brigade, under corps control, will focus on protecting essential rear-area functions and facilities.

Corps engineer support to forward ADA units primarily consists of survivability tasks and will be provided by engineers organic to the maneuver elements or augmenting corps engineer units. Corps engineer support to other ADA efforts also focuses on survivability including digging in fire-direction centers and building protective berms for ADA weapons systems. They also clear fields of fire for ADA weapons systems. Topographic engineers, in coordination with the corps G2, aid in identifying air avenues of approach.

Tactical Command and Control

Tactical C2 is the exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission. Battle command functions are performed through an arrangement of personnel, equipment, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in accomplishing the mission.

Corps engineers support the tactical C2 process by enhancing the survivability of tactical C2 facilities. Engineers construct bunkers and other structures, such as NBC collective protective shelters, to protect commanders, staff, and

critical signal nodes from the effects of enemy fires, thus allowing uninterrupted C2 operations. Corps engineers also provide the general engineering required to support the personnel and systems involved in the C2 process. They construct and repair facilities and install and repair utilities as necessary.

Tactical Combat Service Support

Tactical CSS is the support and assistance provided to sustain forces, primarily in the fields of logistics, personnel services, and health services. This includes arming, fueling, fixing, manning the force, distributing supplies, providing general engineering and MP support, and evacuating noncombatants from the area.

Corps engineer support to CSS efforts focuses on survivability and general engineering. Corps engineers build protective berms, shelters, and revetments for critical CSS facilities and activities. They construct and maintain roads and CSS facilities. They may provide essential utilities including sewage, water, and electrical systems. Corps bridge companies have the capability to provide haul support with their bridge trucks when bridge components are off-loaded.

TYPES OF ENGINEER ORGANIZATIONS

CORPS ENGINEER UNITS

Based on METT-T, the corps task organization may contain several types of corps engineer units to weight its main effort and to conduct other battlefield functions. The engineer organizations that are normally assigned to the corps are listed below.

- Headquarters, Engineer Brigade (Corps)
- Headquarters, Engineer Group (Combat)
- Engineer Battalion (Corps) (Mechanized)
- Engineer Battalion (Corps) (Wheeled)
- Engineer Battalion (Corps) (Light)
- Engineer Battalion (Corps) (Airborne)
- Engineer Battalion (Combat Heavy)
- Engineer Company (Light Equipment)

- Engineer Company (Light Equipment) (Airborne)
- Engineer Company (Combat Support Equipment)
- Engineer Company (Topographic)
- Engineer Company (Ribbon Bridge)
- Engineer Company (Panel Bridge)
- Engineer Company (Medium Girder Bridge)
- Engineer Team (Diving, Light)

Headquarters, Engineer Brigade (Corps)

The brigade is comprised of an organic headquarters and headquarters company (HHC), a

DS topographic company and a variety of other subordinate engineer organizations assigned or attached based on METT-T. Figure 1-1 shows a theoretical corps engineer brigade lay-down. The brigade also provides staffing for a corps SES that supports each corps's CP.

Headquarters, Engineer Group (Combat)

The combat engineer group is the principal subordinate unit of the corps engineer brigade. The combat engineer group's only organic element is its HHC. The engineer group is designed to provide C2 of five to seven subordinate corps engineer units on either an area or functional basis, either far forward in the division and brigade areas or in the corps rear area. Its mission may include being the crossing-force engineer headquarters for major river-crossing operations or during a major deliberate breach of a complex obstacle system. The combat engineer group can also control GS general engineering in the corps and division rear areas, focusing on the construction of MSRs and logistics support bases. A combat engineer group may be task-organized to support a division when the division's augmented corps engineer strength exceeds the C2 capability of the division engineer and his staff. During this situation, the division engineer brigade or battalion commander normally remains as the division engineer staff officer. The combat engineer group operates as a major subordinate command (MSC) under the division, receiving taskings from the division G3 and division engineer.

Engineer Battalion (Corps) (Mechanized)

The mechanized corps engineer battalion consists of an HHC and three line companies. It is almost identical in capability to the division engineer battalions in an armored or mechanized division, but has a larger staff. It is designed to conduct engineer operations in close combat and can fight as mechanized infantry when properly trained and augmented. Mechanized corps engineers provide mobility support to reconnaissance, intelligence, sur-

veillance, and target acquisition (RISTA) forces. This support can involve breaching natural and man-made obstacles and improving trafficability of routes for cavalry regiments, field artillery, and logistics units. During deliberate breaches at division or brigade level, mechanized corps engineers may provide the engineer support to the breach force, preserving the division engineers for follow-on operations; follow and widen breaches conducted by division engineer units; or breach obstacles bypassed by division engineer units. To weight the offensive main effort, mechanized corps engineer battalions can be task-organized to division engineers. In the deliberate defense, mechanized corps engineers augment division engineers in survivability and countermobility operations. Mechanized corps engineers can emplace ground-emplaced scatterable minefield and conventional obstacles such as road craters and bridge demolitions. The battalion has limited general engineering capability and may require support from other corps engineer units.

Engineer Battalion (Corps) (Wheeled)

The wheeled corps engineer battalion consists of an HHC and three line companies. It is designed to provide engineer support to corps close and rear operations and can fight as motorized infantry when properly trained and augmented. Wheeled corps engineers can execute mobility operations forward of the brigade support areas (BSAs) to maintain supply routes used by logistics units, tactical routes, and combat trails. Engineer CSE companies can be task-organized to the battalion to support these types of missions. Wheeled corps engineer units provide countermobility support to corps close operations to prepare the battlefield for decisive operations. They contribute significantly to the emplacement of the corps obstacle plan. Wheeled corps engineers can be task-organized to division engineers, especially in the deliberate defense. Wheeled corps engineers also support corps close and rear operations with horizontal general engi-



neering. They keep LOC open by building, maintaining, and repairing roads, combat trails, forward airfields, and logistics facilities to sustain uninterrupted logistics flow from corps and division logistics units to forward maneuver units. When augmented with additional horizontal and vertical assets, they can construct logistics bases and can perform general engineering operations.

Engineer Battalion (Corps) (Light) and Engineer Battalion (Corps) (Airborne)

These two battalions, though not identical, are very similar in size, equipment, and mission. Both have an HHC and three line companies. They reinforce engineers in light infantry, airborne, and air assault divisions and special operations forces (SOF) units. Their equipment is down-sized and capable of being rapidly deployed anywhere in the world. Light and airborne corps engineer battalions are strategically mobile in order to accompany rapidly-deploying force-projection forces. They are designed to perform engineer support to corps close operations and fight as light infantry when properly trained and augmented. During force-projection operations, these battalions have a limited capability to construct and improve logistics bases; build, maintain, and repair LOC and airfields; and construct individual and vehicle survivability positions for early-deploying contingency forces. The engineer light equipment company and light equipment company (airborne) will often support corps light and airborne engineer battalions. Corps light and airborne engineer battalions have limited obstacle-breaching capability. This constrains them to mainly improving and widening existing breach lanes. In the deliberate defense, these battalions can reinforce light division engineers in countermobility and survivability missions.

Engineer Battalion (Combat Heavy)

The combat heavy engineer battalion executes a wide variety of horizontal and vertical construction missions. It is deployable by ship

and is relatively self-sustaining and able to operate independently in remote areas with security force augmentation. The combat heavy engineer battalion is capable of conducting multiple construction missions simultaneously. The battalion is capable of constructing and providing rapid repair and rehabilitation of facilities such as airfields, roads, bridges, and buildings. With augmentation from specialized engineer companies, detachments, and teams, the combat heavy engineer battalion can manage and assist in the construction of ports, pipelines, water wells, power plants, and power-distribution networks to either austere or complete levels. The battalion can construct TO structures (such as those contained in the Army facilities components system (AFCS)) and erect prefabricated structures. The combat heavy engineer battalion is well suited for support to operations other than war (OOTW) such as those conducted during postconflict, humanitarian assistance, disaster relief, and nation assistance. Combat heavy engineer battalions are normally task-organized to the corps engineer brigade or divisions to reinforce their general engineering capability.

Engineer Company (Light Equipment) and Engineer Company (Light Equipment) (Airborne)

These units support light and airborne engineers and include down-sized, rapidly-deployable engineer equipment. They are normally task-organized to corps or division light and airborne engineer battalions to enhance their horizontal construction capabilities, but may also be task-organized to wheeled or mechanized engineer battalions. These equipment-intensive companies have the capability to perform survivability and general engineering missions. They help the maneuver forces dig in, and can execute earth-moving countermobility missions when supporting a deliberate defense. The corps light equipment companies work with the light and airborne engineer battalions in early deployment with force-projection forces to establish forward logistics bases

until heavier corps and theater engineer assets arrive.

Engineer Company (Combat Support Equipment)

The engineer CSE company is a deployable, equipment-intensive company that possesses significant earth-moving capability. It is normally attached to a corps engineer battalion (wheeled or mechanized) to augment the battalion's horizontal construction capability. It can also operate independently while under the direct control of the combat engineer group. The primary roles for an engineer CSE company are—

- Ž Survivability and tank ditching during deliberate defensive operations in forward brigade areas.
- Ž Horizontal general engineering along MSRs and combat trails in other corps' close-operation areas.
- Horizontal general engineering and survivability in corps' rear areas.

Engineer Company (Topographic)

A topographic engineer company from the theater topographic battalion is placed in DS of the corps. Capabilities of this company include the full spectrum of topographic support, as in the battalion, with personnel and equipment to provide products for the corps's AOs. Depending on the distance from the battalion and the tactical situation, the topographic company may be attached to the corps for administration and nontopographic logistics support. The theater topographic battalion provides topographic supply and intermediate maintenance for topographic equipment. A terrain-analysis element of the company is placed in DS of the corps G3/G2, and another terrain element remains in GS of other customers such as the G4, engineer, and signal. The terrain-analysis element furnishes rapid-response and special-purpose topographic support to the corps staff for operations planning and IPB. The production

assets remain available to all in a central location. The surveyors are normally operating throughout the corps area extending geodetic control. Other elements of the company maybe task-organized and placed in support of a supported division or task force for a limited time and for a particular tactical operation. Requirements that cannot be met by the company because of priority workload or complexity are passed to the topographic battalion for completion. Normally, the corps topographic engineer company is centrally located in the corps rear area.

Engineer Company (Ribbon Bridge)

The engineer ribbon bridge company employs a dependable, versatile float-bridge system which can be rapidly emplaced in a close combat environment. The ribbon bridge company is normally task-organized with a corps engineer battalion or combat engineer group as part of river-crossing operations. The ribbon bridge components can be transported by specialized bridge trucks or sling-loaded by medium-lift helicopters to the bridging site. The engineer ribbon bridge company has a secondary mission of providing logistics haul capability using its bridge transport trucks when the bridge is down loaded.

Engineer Company (Panel Bridge) and Engineer Company (Medium Girder Bridge)

These engineer fixed-bridge companies are capable of rapidly emplacing tactical standard bridging, either panel bridges (normally Bailey bridges) or medium girder bridges (MGBs), over wet or dry gaps in a close combat environment. These fixed bridges can be used to replace assault float bridges or to bridge gaps that exceed the capabilities of the armored vehicle launched bridge (AVLB). Normally, these engineer fixed-bridge companies are task-organized to a corps engineer battalion or combat engineer group to support gap-crossing operations. These companies also have a secondary mission of providing logistics haul capability using its organic trucks when the bridge is down loaded.

Engineer Team (Diving, Light)

The engineer diving team (light) is capable of supporting the corps commanders' diving requirements on the battlefield. The team focuses on offensive, defensive, retrograde, river-crossing, deception, and ADC operations. It is capable of underwater construction, underwater reconnaissance, underwater obstacle emplacement and reduction, and river-crossing support, all of which require mobile equipment. It is also capable of supporting diving requirements in ports, harbors, and coastal zones. However, it lacks the heavy equipment required to support major port construction projects, decompression dives, and salvage operations. The team can provide its capabilities in support of OOTW.

CORPS ENGINEER SUPPORT TO DIVISIONS, SEPARATE BRIGADES, AND CAVALRY REGIMENTS

The corps engineer brigade augments engineer units organic to divisions, separate brigades, and cavalry regiments based on METT-T. These organic engineer units are focused on close combat mobility, countermobility, and survivability support to maneuver forces. Corps engineers provide additional support in these functions along with general and topographic engineering support. Engineer organizations organic to divisions, separate brigades, and cavalry regiments that can be reinforced by the corps engineer brigade are listed below.

Division

- Engineer Brigade (Heavy)
- Engineer Battalion (Light)
- Engineer Battalion (Airborne)
- Engineer Battalion (Air Assault)

Separate Maneuver Brigade

- Engineer Company

Cavalry Regiment

- Engineer Company

Headquarters, Engineer Brigade (Heavy)

The armored or mechanized division has an organic engineer brigade with a headquarters

and headquarters detachment (HHD) and mechanized division engineer battalions. They normally train and operate with each maneuver brigade in the division forming habitual-support relationships. The armored or mechanized division engineer brigade commander also serves as the division engineer special staff officer. The armored or mechanized division engineer headquarters provides centralized C2 and planning for the total division engineer effort. It recommends the task organization for division engineer battalions and reinforcing corps engineer battalions and separate engineer companies to the division commander or G3 based on METT-T. The armored or mechanized division engineer brigade commander may detach companies from one division engineer battalion to another battalion (main effort) or to another maneuver unit such as the division cavalry squadron. Mechanized corps engineer battalions and CSE companies normally are task-organized to the armored or mechanized division. The armored or mechanized division engineer controls and staff supervises corps engineer assets working in the division AO on a task or mission basis.

Engineer Battalion (Light)

The light infantry division has an organic light engineer battalion with an HHC and three light division engineer companies. These companies establish and maintain a habitual-support relationship with each light infantry brigade in the division. The light division engineer battalion commander also serves as the division engineer special staff officer. He focuses on supporting the light division fight by recommending the task organization of elements of the battalion assault and obstacle (A&O) platoon, light combat engineer platoons, and corps' assets to the division commander or G3. The task organization of light division engineers depends on METT-T and requires extreme flexibility. Light division engineers must be concentrated at the main effort location, at the critical time, under centralized control. Austere light engineer companies re-

quire extensive augmentation from the corps engineer brigade for extended and force-projection operations. An engineer group with a corps light engineer battalion, corps wheeled battalions, a light engineer equipment company, and CSEs is normally task-organized to the light infantry division. The light division engineer controls and staff supervises engineer assets working in the light division's AO on a task or mission basis.

Engineer Battalion (Airborne)

The airborne division has one organic airborne division engineer battalion with an HHC and three airborne division companies. These companies establish and maintain a habitual-support relationship with each airborne infantry brigade in the division. The airborne division engineer battalion commander also serves as the division engineer special staff officer. He focuses on supporting the airborne division fight by recommending the task organization of the battalion A&O platoon, airborne combat engineer platoons, and supporting corps' assets to the division commander or G3. The task organization of airborne division engineers depends on METT-T and requires extreme flexibility. Airborne division engineer companies are fairly austere with limited organic equipment assets, including small emplacement excavators (SEFJs), Volcano scatterable-mine systems, and airborne engineer squad vehicles. For extended and force-projection operations, the airborne engineer battalion requires extensive augmentation from the corps engineer brigade. A corps airborne engineer battalion and light engineer equipment company (airborne) are normally task-organized to the airborne division. The airborne division engineer controls and staff supervises corps engineer assets working in the division's AO on a task or mission basis.

Engineer Battalion (Air Assault)

The air assault division has one organic air assault division engineer battalion with an

HHC and three air assault engineer companies. These companies develop and maintain a habitual-support relationship with each air assault brigade in the division. The air assault division engineer battalion commander also serves as the division engineer special staff officer. The air assault division engineer battalion commander focuses on supporting the air assault division fight by recommending the task organization of the battalion A&O platoon, air assault combat engineer platoons, and corps' assets to the division commander or G3. The task organization of air assault division engineers depends on METT-T and requires extreme flexibility. The air assault division engineer battalion organization is similar to the airborne division engineer battalion but has enhanced tactical mobility due to access to the air mobility assets organic to the air assault division. For extended and force-projection operations, the air assault engineer battalion requires extensive augmentation from the corps engineer brigade. A corps light engineer battalion and light engineer equipment company are normally task-organized to the air assault division. The air assault division engineer controls and staff supervises these and all other corps engineer assets working in the division's AO on a task or mission basis.

Engineer Company (Separate Maneuver Brigade)

Except for their smaller size, separate armored, infantry, and light infantry brigades have essentially the same characteristics as divisions. These brigades can be used to augment divisions but are capable of operating as independent units. Separate maneuver brigades have an organic engineer company with three engineer platoons and an A&O platoon that develop and maintain habitual-support relationships with battalion task forces in the brigade. The separate brigade also has a brigade staff engineer section which provides centralized planning for the total brigade engineer effort by recommending to the brigade commander or S3 a task organization of separate

brigade engineer squads, platoons, and corps assets based on METT-T. The separate brigade engineer company commander may detach squads from one separate brigade engineer platoon to another platoon (main effort). A corps engineer battalion is normally task-organized to the separate maneuver brigade. When this occurs, the corps engineer battalion normally absorbs the separate brigade organic engineer company as its fourth line company. The corps engineer battalion staff augments the separate brigade engineer staff section for planning and controlling operations. If the task organization of the corps engineer battalion to the separate brigade is long term, the corps engineer battalion commander normally becomes the separate brigade engineer.

Engineer Company (Cavalry Regiment)

The cavalry regiment performs reconnaissance, security, and economy-of-force operations for the corps. The regiment has organic air and ground cavalry units that can operate as combined arms teams over wide areas. The regiment may conduct offensive, defensive, or retrograde operations. It has significant mobile, antiarmor capability and can effectively conduct covering-force, flank-security, or counterattack operations. It may be attached to a division but is capable of independent operations. The regiment has an organic engineer company with three engineer platoons and an A&O platoon that develop and maintain habitual-support relationships with regimental ground squadrons. The regiment also has a separate regimental engineer staff section which provides centralized planning for the total regimental engineer effort. It recommends to the regimental command or S3 the task organization of engineer squads, platoons, and corps assets based on METT-T. The cavalry regiment engineer company commander may detach squads from one engineer platoon to another platoon (main effort). A corps engineer battalion is normally task-organized to the cavalry regiment. When this occurs, the corps engineer battalion normally absorbs the cav-

alry regiment's organic engineer company as its fourth line company. The corps engineer battalion staff augments the regimental engineer staff section for planning and controlling operations. If the task organization of the corps engineer battalion to the cavalry regiment is long term the corps engineer battalion commander normally becomes the regimental engineer.

THEATER ENGINEER SUPPORT TO THE CORPS

The corps engineer brigade is augmented by other theater engineer organizations from EAC based on METT-T. Theater engineer forces focus primarily on general and topographic engineering operations. Theater general engineering operations include—

- LOC (roads, airfields, ports, railways, and canals) construction, maintenance, and repair.
- Pipeline construction.
- Logistics facility support.
- Rear-area restoration.
- ADC.
- Production and preparation of construction materials.
- Real estate management.
- Support to theater units and C2 facilities.

Theater topographic engineering operations provide the full spectrum of topographic support to all TA assets and, when directed, to joint and multinational commands. Theater engineer organizations (normally assigned to an ENCOM headquarters in a mature theater) can be task-organized to the corps engineer brigade in support of force-projection opera-

tions when required. Theater engineer organizations that can augment the corps engineer brigade are listed below.

Headquarters, Engineer Command
 Headquarters, Engineer Brigade (Theater)
 Headquarters, Engineer Group (Construction)
 Engineer Battalion (Combat Heavy)
 Engineer Battalion (Topographic)
 Engineer Battalion (Prime Power)
 Engineer Company (Port Construction)
 Engineer Company (Pipeline Construction)
 Engineer Company (Construction Support)
 Engineer Company (Dump Truck)
 Engineer Battalion HHD
 Engineer Cellular Teams and Detachments

Headquarters, Engineer Command

The ENCOM is located at TA and is responsible for theater operational engineering, construction, and topography. Its composition is tailored based on METT-T and can consist of a number of theater engineer brigade headquarters, construction engineer group headquarters, engineer battalions (combat heavy, topographic, and prime-power), engineer companies (port construction, pipeline, construction support, and dump truck), and detachments or teams (well-drilling, diving, fire-fighting real estate, utilities, prime-power, power-line construction dredging, asphalt, quarry, and engineer civic action). The ENCOM task-organizes its subordinate units as necessary. During force-projection operations, the TA may use a corps engineer brigade headquarters or theater engineer brigade headquarters until an ENCOM is deployed. The ENCOM will deploy in increments to the theater, reaching full status as the theater matures. Until this occurs, the ENCOM or the USACE will augment that headquarters. The ENCOM performs the following functions:

- Planning and coordinating theater engineer operations.
- Assessing theater infrastructure requirements.

- Planning, coordinating, and supervising military and contract construction and engineering services to the Army, other services, and coalition forces in the theater.
- Allocating engineer resources (units, contractors, materials, and equipment) to meet mission requirements.
- Prioritizing the use of available theater engineer assets, including tradeoffs between combat and construction requirements.
- Coordinating topographic and military geographic intelligence support to the force.
- Providing real estate support to the Army, other services, and allies throughout the theater.
- Providing technical assistance to real property maintenance activities (RPMA) throughout the theater.
- Planning construction material requirements and prioritizing their use.
- Providing special engineer support to the theater such as pipeline construction, port construction, dump truck, prime-power, and fire-fighting.

Headquarters, Engineer Brigade (Theater Army)

The TA engineer brigade is the principal subordinate unit of the ENCOM. The engineer brigade has an organic HHC and is tailored based on METT-T. It may have a number of engineer group headquarters, engineer battalions, companies, detachments, and teams. The engineer brigade's AO should coincide with Theater Army Area Command (TAACOM) boundaries whenever possible. During force-projection operations, the engineer brigade, with augmentation from the ENCOM or USACE, may deploy alone. The engineer brigade's C2 capabilities

are similar in those of the ENCOM, with the exception of the topographic support function.

Headquarters, Engineer Group (Construction)

The construction engineer group has an organic HHC and can provide C2 for up to seven engineer battalions, plus a number of separate companies, detachments, and teams. It is the principal subordinate unit of a TA engineer brigade. The construction engineer group FUNCTIONS as the principal construction manager for a given area or given tasks. It has a large planning and design capability. The construction engineer group operating areas normally coincide with area-support-group (ASG) boundaries. In force-projection theaters, a construction engineer group attached to a corps engineer brigade may be all that is deployed for C2 of theater engineers. The engineer group will be weighted with specialized engineer units to execute specific taskings. Construction engineer group C2 capabilities include—

- Planning, designing, coordinating, and supervising general troop construction support to the Army, other services, and agencies within the group's assigned AO.
- Planning, designing, coordinating, and supervising construction or rehabilitation of facilities within the group's area.
- Allocating assigned engineer troops, materials, and equipment to projects.
- Functioning as a corps engineer group.

Engineer Battalion (Combat Heavy)

The combat heavy engineer battalion executes a wide variety of horizontal and vertical construction missions. It is deployable by ship and relatively self-sustaining and able to operate independently in remote areas with security force augmentation. The combat heavy

engineer battalion is capable of conducting multiple construction missions simultaneously. The battalion is capable of constructing and providing rapid repair and rehabilitation of facilities such as airfields, roads, bridges, and buildings. With augmentation from specialized engineer companies, detachments, and teams, the combat heavy engineer battalion can manage and assist in the construction of ports, pipelines, water wells, power plants, and power-distribution networks to either austere or complete levels. The battalion can construct TO structures (such as those contained in the AFCS) and erect prefabricated structures. The combat heavy engineer battalion is well suited for support to OOTW such as those conducted during postconflict, humanitarian assistance, disaster relief, and nation assistance. Combat heavy engineer battalions are normally task-organized to the corps engineer brigade or divisions to reinforce their general engineering capability.

Engineer Battalion (Topographic)

The theater engineer topographic battalion provides the full spectrum of topographic support to all TA assets and, when directed, to joint and multinational commands. This includes—

- Terrain analysis.
- Precise positioning (geodetic) surveys.
- Production of mapping, charting, and geodesy (MC&G) products.
- Data-base management (both hard copy and digital).
- Special product storage and distribution.
- Supply of topographic material.
- Intermediate maintenance support of topographic equipment.

The battalion consists of an HHC, one topographic engineer company in GS of the theater, and one topographic company for each supported corps. Requirements for topographic engineer support are developed by the theater intelligence staff and coordinated by the assistant theater topographic engineer (ATTE). The theater engineer is responsible for coordinating and tasking topographic missions. The topographic engineer battalion is functionally organized around data collection assimilation, and analysis. The process is highly automated and relies on high-speed data transmission, graphic display and production capabilities. The battalion works closely with MI units to use current sources of imagery that can be quickly turned into image maps. The battalion uses data bases produced by the Defense Mapping Agency (DMA) and civil and national satellite imagery systems, along with local data sources, to compile and transmit terrain-analysis products to maneuver units. The battalion may provide limited map distribution support until quartermaster map distribution units arrive. Terrain assets of the battalion support company will support SOF.

Engineer Battalion (Prime Power)

The prime-power engineer battalion provides quickly-deployable prime-power companies and teams to force-projection theaters within 72 hours. Prime-power units provide the necessary electrical continuity between tactical generators (TACGENs) and commercial power sources in theater. They also support general engineering operations in the communications zone (COMMZ), providing power generation and power-related technical support to rear-area units (such as air defense), facilities (such as hospitals), and activities (such as Force provider). Prime-power support may extend forward into the corps area at the direction of the theater engineer. Prime-power units also support postconflict operations and OOTW.

Engineer Company (Port Construction)

The engineer port construction company is designed to augment a combat heavy battalion. This results in a task force that has the capability to support joint logistics-over-the-shore (LOTS) operations, provide moorings and anchorage for ocean-going vessels, construct and rehabilitate cargo loading and off-loading facilities, and remove underwater obstacles (to include dredging and demolitions).

Engineer Company (Pipeline Construction)

The engineer pipeline construction company is designed to augment a combat heavy battalion, resulting in a task force capable of providing pipeline construction and major maintenance for the movement of bulk petroleum, oils, and lubricants (POL).

Engineer Company (Construction Support)

The engineer construction support company provides specialized construction capability and construction materials production. Its functions include rock crushing and bituminous mixing and paving for major horizontal construction missions such as paved roads, storage facilities, and airfields. It normally augments a combat heavy battalion.

Engineer Company (Dump Truck)

The engineer dump truck company augments the material-haul capability of construction units for large, long, or extended construction material-haul requirements.

Engineer Battalion (Headquarters and Headquarters Detachment)

The engineer battalion HHD provides C2 of separate theater engineer construction companies, cellular detachments, and teams. The headquarters detachment augments the staff of an ASG in the execution of RPMA for ASG bases, including construction contracting and

host-nation support. It also may serve as a Directorate of Public Works (DPW) for specific theater installations.

Engineer Cellular Teams and Detachments

Engineer detachments and cellular teams provide flexible, tailorable specialized engineer capability to the theater. These teams and detachments are typically small and have very little organic CSS or staff planning capability. Engineer construction material production teams produce crushed rock asphalt paving materials, and lumber, as appropriate, to augment indigenous theater capability. Engineer special-purpose detachments and teams perform critical engineer tasks. These include the following.

- Engineer equipment operation team.
- Well-drilling team.
- Ž Heavy diving team.

- Fire-fighting team.
- Real estate team.
- Utilities team.
- Prime-power detachment.
- Powerline construction team.
- Dredging team.
- Ž Civic-action team.
- Ž USACE water-detection team.
- Ž USACE contingency real estate support team (CREST).
- Ž USACE contract support team.