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ENGINEER OPERATIONS—BRIGADE COMBAT TEAM AND BELOW

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Engineer Operations—Brigade Combat Team and Below

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Preface

This manual provides a doctrinal foundation for the conduct of engineer operations in support of unified land operations that are focused on tactical maneuvers at the brigade combat team (BCT) level and below. The engineer support doctrine for the BCT is focused on tactical-level maneuvers. The engineer organizations that are organic to the BCT are optimized to perform combat engineering tasks (primarily mobility with limited capabilities in countermobility and survivability). Geospatial engineering support is provided by organic terrain teams. Additional engineering support (combat and general) comes from engineer organizations that are task-organized to the BCT or that provide support from echelons above brigade (EAB) organizations. This manual is aligned with current BCT doctrine and describes engineer support for the armored BCT, infantry BCT, and Stryker BCT. (See FM 3-90.6.) Although the armored cavalry regiment and engineer company are not specifically addressed, the basic principles of this manual also apply to those organizations.

The principal audience for this manual is commanders and staffs at the BCT level and below. It is a primary manual for instructional purposes within the United States (U.S.) Army Engineer School and assists other Army branch schools in teaching the integration of engineer capabilities into Army operations.

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

Unless otherwise stated, masculine nouns or pronouns do not refer exclusively to men.

ATP 3-34.22 uses joint terms where applicable. Selected joint and Army terms and definitions appear in the text. For definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition. This publication is not the proponent for any terms.

This manual applies to Active Army, Army National Guard/Army National Guard of the United States, and U.S. Army Reserve unless otherwise stated.

The proponent of ATP 3-34.22 is the U.S. Army Engineer School. The preparing agency is the Maneuver Support Center of Excellence (MSCoE) Capabilities Development and Integration Directorate; Concepts, Organizations, and Doctrine Development Division; Doctrine Branch. Send comments and recommendations on DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) to Commander, U.S. Army Maneuver Support Center of Excellence, ATTN: ATZT CDC, 14000 MSCoE Loop, Suite 270, Fort Leonard Wood, MO 65473-8929; e-mail the DA Form 2028 to <usarmy.leonardwood.mscoe.mbx.cdidcodddengdoc@mail.mil>; or submit an electronic DA Form 2028.

Introduction

This manual provides engineer doctrine for operating at the BCT level and below and within the framework of unified land operations. This manual also provides greater detail for commanders and staffs at brigade echelons and below to ensure the synchronization of engineer capabilities across the range of military operations.

Many of the tactical tasks associated with combat and general engineering support have remained constant although current and proposed future operational environments have dramatically shifted with the emergence of new threats (such as improvised explosive devices [IEDs]) and an increased emphasis on stability operations. Another significant change involves Army reorganization and restructuring of the force and the effects that they have on doctrine and operations. Changes that directly affect this manual include the—

- Restructure of engineer organizations within each of the three types of BCTs and within the armored cavalry regiment.
- Likelihood that the operations conducted will be with unified action partners. (The primary focus of joint engineer operations is to achieve the commander's intent by coordinating engineer support throughout the joint area of operations.)
- Alignment of engineer doctrine that supports BCTs.
- Consequential changes in the basic Army organizational structure and equipment of engineer organizations.

This manual is not meant to be a substitute for thought and initiative among engineer leaders. Regardless of how robust the doctrine is or how advanced the new engineer capabilities and systems are, the engineer Soldier must understand the operational environment, recognize shortfalls, and adapt to the situation on the ground. Adaptable and professional engineer regiment Soldiers are important to our future, and they must be able to successfully perform basic skills and accomplish the mission with or without the assistance of technology.

Chapter 1

Engineer Support to the Brigade Combat Team

Engineers who support maneuver forces today face unique challenges, not only with the unpredictability of the operational environment in which they operate, but also in the adaption of the organizational restructuring of the Army as it continues to transform. Within the BCT, this transformation has resulted in a streamlined, organic engineer company and a reliance on task-organized EAB engineer augmentation. This chapter discusses the need for engineer support within the BCT, the mechanism for providing responsive and mission-tailored engineer capabilities, and the integration of the engineer functions (combat, general, and geospatial engineering) throughout the warfighting functions to generate combat power in combined arms activities.

REQUIREMENTS

1-1. The Army operational concept is unified land operations. *Unified land operations* are how the Army seizes, retains, and exploits the initiative to gain and maintain a position of relative advantage in sustained land operations through simultaneous offensive, defensive, and stability operations in order to prevent or deter conflict, prevail in war, and create the conditions for favorable conflict resolution (ADP 3-0). In unified land operations, Army forces adapt to the requirements of the operational environment and conduct operations within it by using decisive action to defeat adversaries on land by means of Army core competencies. Integrated engineer support is not only critical in conducting combined arms activities in decisive action, but it also adds to the combined arms commander's understanding of operational environment requirements.

OPERATIONAL ENVIRONMENTS

1-2. ADRP 3-0 describes an operational environment in terms of eight operational variables (political, military, economic, social, infrastructure, information, physical environment, and time). However, these variables are too broad for planning at the tactical level. Army leaders at the BCT level and below narrow their focus to the six mission variables (mission, enemy, terrain and weather, troops and support available, time available, and civil considerations [METT-TC]). After a mission or warning order is received, an analysis of the operational environment (in terms of mission variables) provides the relevant information that commanders use to frame tactical problems. Engineers must understand these mission variables to best understand how to leverage the capabilities that are organized into the engineer functions to advise the BCT commander and support the BCT mission. (See FM 3-34 for engineer-specific tasks.)

1-3. Understanding the operational environment is essential to successful operations. As with other leaders, Army engineers are challenged to understand the operational environment they face and to apply their knowledge and capabilities to support the force. They must also be prepared to face future adversaries that are adaptive and have a wide array of capabilities that allow them to successfully fight a more technologically superior force. In the operational environment, engineers have difficulty predicting an enemy course of action (COA) based on threat templates. Engineers must be able to describe an enemy force in terms of the function (fixing, assaulting, exploiting, shielding) of subelements, not in terms of where it might be found on a contiguous battlefield. Engineers have to develop methods to discern and identify threat engineer patterns of behavior. Engineers can also anticipate dealing with increased explosive hazards throughout the contiguous and noncontiguous area of operations.

1-4. Maneuver commanders rely on engineer disciplines to add breadth and depth to the overall understanding of the operational environment. The engineer perspective shares a general understanding of

the operational environment and adds a degree of focus on the aspects within the purview of an engineering background. Guided by a common understanding, the engineer perspective seeks to identify the potential challenges and opportunities that are associated with operational environment variables. Engineer capabilities are significant force multipliers in joint operations, facilitating the freedom of action necessary for the joint force commander to meet mission objectives. Engineer operations modify, maintain, provide understanding of, and protect the physical environment. In doing so, they—

- Assure the mobility of friendly forces.
- Alter the mobility of adversaries.
- Enhance the survivability and enable the sustainment of friendly forces.
- Contribute to a clear understanding of the physical environment.
- Provide support to noncombatants, other nations, and civilian authorities and agencies.

TEAM STAFFS AND ORGANIZATIONS

1-5. BCT staff sections are organized into functional and integrating cells. This organization may vary, depending on the mission assigned to the BCT. The BCT staff usually organizes the following five functional cells:

- Movement and maneuver.
- Intelligence.
- Fires.
- Sustainment.
- Protection.

1-6. The brigade engineer battalion (BEB) commander is the brigade engineer in the BCT. The BEB commander advises the maneuver commander on how best to employ combat, general, and geospatial engineering capabilities in support of decisive action. The BEB provides organic engineer, military intelligence (MI), signal (antitank company–Stryker BCT only), planning, and execution capabilities to the BCT.

ASSISTANT BRIGADE ENGINEER SECTIONS

1-7. The engineer battalion staff is responsible for coordinating engineer assets and activities for the command. When an organic engineer battalion does not exist at the BCT (as is the case in an infantry BCT or when a brigade special troops battalion has not converted to an engineer battalion), the brigade engineer is then the senior engineer supporting that BCT. The assistant brigade engineer (ABE) section is usually located in the BCT main command post, but it may occasionally be located at the tactical command post.

1-8. The primary duty of the ABE section is to coordinate engineer activities in support of the BCT. The ABE section must understand the full array of engineer capabilities (combat, general, and geospatial engineering) that are available to the force and synchronize them to best meet the needs of the maneuver commander. The ABE section integrates specified and implied engineer tasks into the maneuver unit plan and ensures that supporting engineer units are integrated into mission planning, preparation, execution, and assessment activities. Regardless of the task organization, the ABE section is responsible for planning and monitoring engineer units that support the maneuver unit. During the conduct of engineer missions, the engineer staff plans, prepares, executes, and assesses operations.

1-9. When planning for operations, the ABE section—

- Assists the intelligence staff officer (S-2) with intelligence preparation of the battlefield (IPB), which includes obtaining information from the preparation of the engineer running estimate.
- Determines and evaluates critical aspects of the engineer situation.
- Formulates COAs or schemes of engineer operations for engineer support to meet the maneuver commander's intent.
- Prioritizes engineer missions that must be accomplished to support current and future operations.
- Integrates geospatial products into the planning process to explain the military significance of the terrain to the commander and staff and to support decisionmaking.

- Advises the commander on—
  - Using organic and nonorganic engineer assets.
  - Employing and reducing obstacles.
  - Providing survivability efforts.
  - Employing engineer reconnaissance.
- Identifies support requirements for EAB engineer and other related assets throughout the operation.
- Causes the maneuver commander to be aware of the capabilities, limitations, and employment considerations of supporting engineers and related assets.
- Develops a scheme of engineer operations that is concurrent with maneuver COAs.
- Recommends—
  - Engineer priorities of effort and support.
  - Essential tasks for mobility, countermobility, and survivability.
  - Acceptable mission levels of risk to the commander.
- Recommends the engineer organization, command and support combat relationships, and task organization changes throughout the operation.
- Visualizes the future state of engineer activities within the supported maneuver unit.
- Integrates the engineer functions of combat, general, and geospatial engineering into the future plans of the supported maneuver unit.
- Develops a plan for engineer support if the BCT tactical command post deploys separately.
- Develops an obscuration support plan for offensive and defensive mission employment.

1-10. When preparing for operations, the ABE section—

- Trains the engineer cell located within the main command post and BCT tactical command post.
- Issues timely instructions and orders to subordinate engineer units through the maneuver unit base order to simplify preparation and integration.
- Develops the necessary input to maneuver unit orders and annexes and engineer unit orders.
- Coordinates the production and distribution of maps and terrain products.
- Recommends intelligence requirements to the S-2.
- Participates in the targeting process.
- Participates in appropriate working groups.
- Plans and coordinates with the fires cell on the integration of obstacles and fires.
- Recommends main supply routes (MSRs) and logistics areas to the logistics staff officer (S-4) based on technical information derived from the terrain analysis.
- Coordinates to support the mobility, countermobility, and survivability effort.
- Coordinates with the maneuver unit S-4 to support base camp, facility, and other sustainment-related construction requirements.
- Advises the commander on environmental issues.
- Coordinates with other staff members to determine the impact of operations on the environment.
- Assists the commander in integrating environmental considerations into decisionmaking.
- Recommends when engineer dive support may facilitate specific engineer reconnaissance in support of the maneuver unit mission.
- Ensures that enablers to mitigate explosive hazards (explosive ordnance disposal [EOD] personnel, military working dogs, electronic warfare officers) are integrated into operations.
- Conducts coordination with division engineer staff and adjacent engineer units.

1-11. When executing operations, the ABE section—

- Uses the feedback received from subordinate maneuver and engineer units to develop alternative COAs in the engineer plan for the BCT commander.
- Provides operational readiness and location information on the status of engineer assets on hand.

- Makes time-sensitive recommendations on requests for immediate engineer support received from subordinate units and implements decisions.
- Monitors the execution of engineer orders and instructions by tracking current command post operations.

1-12. When assessing operations, the ABE section—

- Tracks and disseminates higher, lateral, and lower planned and known obstacles, scatterable mines, survivability conditions, route conditions, engineer missions, lane conditions, and other engineer-specific information.
- Establishes and maintains a continuous, open link among engineer cells, engineer staffs, and supporting engineer command posts.
- Uses the running estimate and the continuous link with supporting engineer staffs and units to compute resource and force requirements and recommend engineer task organization.
- Monitors the execution of engineer orders and instructions by tracking current operations and assessing impacts to future operations.
- Uses reports from engineer units to measure and analyze engineer performance and anticipate change and unforeseen requirements.

1-13. The ABE plays a vital role in targeting lethal and nonlethal effects. Preparation and focus are keys to successful targeting meetings. The primary role of the ABE is to ensure that lethal effects are integrated with obstacles to provide desired effects and to plan and coordinate artillery-delivered and tactical aircraft-delivered scatterable mines. The ABE ensures that these obstacles meet the BCT commander's intent and are placed in the most advantageous location with reinforcing terrain. The ABE also—

- Participates in the targeting working group.
- Coordinates for establishing critical friendly zones at planned breach and crossing sites.
- Coordinates the survivability effort to protect critical BCT assets, such as radars and mission command nodes.
- Advises the BCT commander and fires cell on environmental considerations (to include cultural properties) as the integrator that may be affected by lethal fires.
- Advises the staff on possible damage to local infrastructure as the integrator that would adversely affect the attitude of the local population.
- Advises the BCT commander of the impacts to friendly mobility caused by lethal effects (such as remote antiarmor mines [RAAMs]/area denial artillery munitions [ADAMs] employed on mobility corridors).
- Gathers technical information on enemy engineer units and equipment that are potential high-payoff target nominations, to include their relative locations.
- Provides recommendations for airtasking order nominations (normally based on a 72-hour cycle) for tactical, air-employed, scatterable mines.
- Assists in developing named areas of interest (critical infrastructures, obstacle locations, enemy engineer equipment).
- Updates the engineer portion of the intelligence update that is derived from new information on enemy engineer units, activities, or obstacles (known or predicted) based on results of information collected or engineer reconnaissance conducted.
- Provides updates for friendly and enemy effects of terrain and weather based on engineer information on terrain or reconnaissance.
- Provides additional geospatial products, as necessary, to support targeting decisions.

INFORMATION COLLECTION ENGINEER CONSIDERATIONS

1-14. If the BCT elects to conduct separate information operations, targeting meetings, or internal cell meetings before the BCT targeting meeting occurs, the ABE or a representative participates. Engineer participation in targeting provides a medium for integrating the nonlethal effects of specific engineer capabilities. It also provides the ABE with an excellent opportunity to implement engineer requirements

into the prioritization of information collection, public affairs activities, military information support operations (MISO), and the tasking of limited assets within the BCT.

1-15. Although not part of an information collection planning cell, the public affairs officer coordinates with nonlethal operations to ensure that disseminated information is not contradictory. The ABE coordinates with the public affairs officer for the inclusion of engineer operations within BCT public affairs programs, including HN and U.S. media coverage of engineering projects.

1-16. The ABE coordinates with the BCT MISO officer for MISO surveys in local communities to compare pending engineering projects with local population desires. MISO and public affairs support each other by synchronizing messages, ensuring the credibility of the information being provided to the general population by HN and U.S. forces, especially with regard to engineering projects. MISO can also reduce civilian interference with friendly military operations.

1-17. The engineer knowledge of public works and HN infrastructure (derived from participation in infrastructure reconnaissance and surveys) can assist the inform and influence activities staff officer (S-7) in identifying information collection-specific, high-value targets. Engineer planners also provide current information regarding the status and plans for engineer projects throughout the area of operations and area of interest. (See FM 3-34.170 for additional information on infrastructure reconnaissance.)

1-18. Restoring the basic needs of the population is critical to winning the support of the HN. Engineering projects executed by the BCT help set conditions to achieve many desired nonlethal effects. These projects can facilitate positive targeting of local leaders and communities. An example of positive targeting could be the execution of a priority project that has been requested by a local political or tribal leader. When the project is accomplished, the population perceives that it was done for the local leader and legitimizes his position. The target (local leader) then becomes more favorable to friendly operations, followed by more favorable reactions by the local population. As friendly forces receive local support and legal agreements with the HN are secured, successful operations increase. (See FM 3-55 for additional information on information collection.)

UNIFIED LAND OPERATIONS

1-19. BCTs typically require engineer augmentation for offensive and defensive missions. The ABE assesses the requirement of additional engineer capability and capacity during mission analysis and provides input on recommended augmentation. Recommended capabilities may include combat, general engineering, and/or specialized engineering capabilities to support BCT maneuvers.

1-20. Stability and defense support of civil authorities (DSCA) change the nature and focus of much of the engineer support to the BCT. While the augmentation of selected combat engineering skills remains essential, the likely requirement centers on general engineering organizations (including the United States Army Corps of Engineers [USACE]) and capabilities. As with support for combat operations, engineer augmentation may come in teams, sections, platoons, or companies or under the mission command of a task-organized, multifunctional, battalion-size engineer task force headquarters. If so, the focus of the engineer battalion task force will likely be on general engineering support, with an emphasis on reestablishing infrastructure within the area of operations.

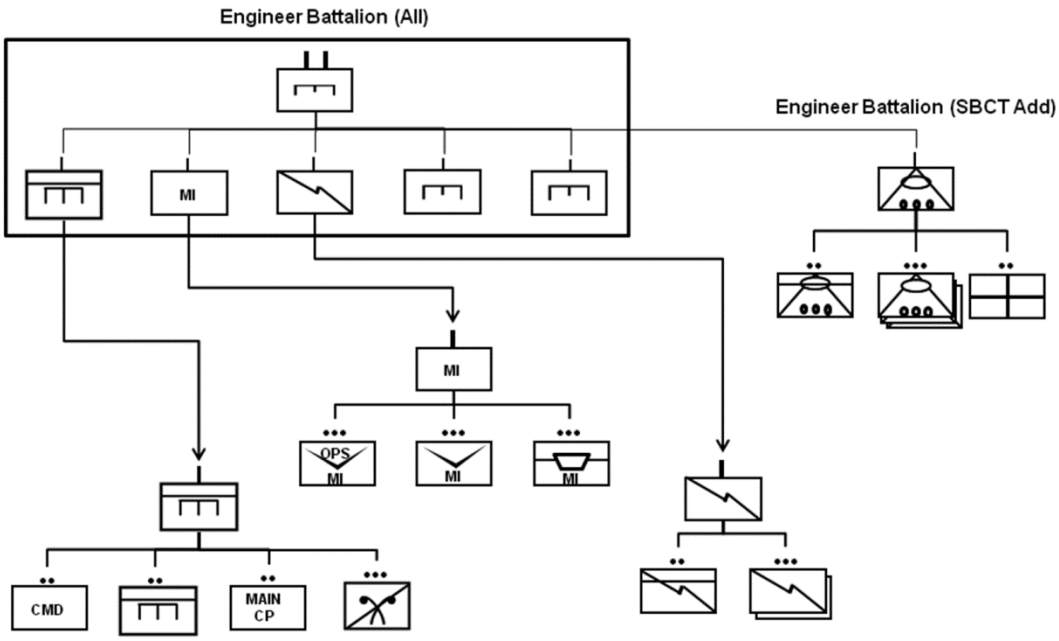
BRIGADE ENGINEER BATTALIONS

1-21. The BEB in each BCT provides a baseline of combat capabilities that can be augmented with specialized units from the EAB. The ABE section within the BCT staff identifies the required augmentation and coordinates its application. Each BCT has organic geospatial engineering capabilities to provide a baseline of geospatial support. Additional Army, joint, multinational, interagency, and other engineering capabilities may be available and task-organized to augment the BCT for various phases of the operation. Additional Army engineering capabilities are organized within an engineer force pool. The construct of the Army engineer operational force is a complementary and interdependent relationship between four major unit categories (organic engineer, engineer headquarters, baseline engineer, and specialized engineer).

ORGANIC ENGINEER UNITS

1-22. An armor BCT and an infantry BCT may have a special troops battalion or a BEB during the transition to a BEB. The Stryker BCT will have an organic BEB that includes a separate engineer company. The conversion of a special troops battalion to the BEB in an armor BCT and infantry BCT will reflect a separate engineer company. (See FM 3-90.61 for information regarding units that have not transitioned to a BEB.)

1-23. The BEB has the mission command of assigned and attached engineer companies and is assigned an MI company; a signal company; and a chemical, biological, radiological, and nuclear (CBRN) reconnaissance platoon (located in the headquarters and headquarters company). In the Stryker BCT, the battalion provides mission command for an antitank company. The BEB provides maneuver support for bridging, breaching, route clearance, explosive hazards identification, and horizontal construction support. (See figure 1-1.)



Legend:	
add	addition
cmd	command
CP	command post
MI	military intelligence
ops	operations
SBCT	Stryker brigade combat team

Figure 1-1. Brigade engineer battalion

1-24. The BCT commander issues mission orders for organic units. The command and support relationship dictates whether the BEB will logistically support, or coordinate support with, the BCT, brigade support battalion (BSB), or other unit higher headquarters. Unless the BCT directs otherwise, the BEB retains command and support relationships with organic and attached units, regardless of their location on the battlefield. The companies may be further task-organized to maneuver task forces, the cavalry squadron, or a subordinate company or troop.

1-25. In extreme circumstances, the BEB may be directed to secure BCT command posts or execute security missions for areas that are not assigned to another unit in the BCT area of operations, or the BEB may be assigned responsibility for base camp defense, sustainment area defense, or terrain management.

The BCT must weigh the risks that are associated with these missions. They could diminish the BEB ability to operate as a functional headquarters, or they could reduce engineer support to combined arms battalions and cavalry squadrons. If the BEB assumes responsibility for these special missions, the fundamental role of the BEB changes from being a supporting unit in the BCT to being a supported unit of the BCT. To mitigate risk, the BEB staff may recommend additional engineer augmentation from EAB units and staff. The BEB can defeat Level 1 threats and, with augmentation, organize response forces to defeat threats that are more organized.

HEADQUARTERS AND HEADQUARTERS COMPANIES

1-26. The headquarters and headquarters company consists of a battalion headquarters, company headquarters, CBRN reconnaissance platoon, sustainment medical section, and sustainment unit ministry team. The headquarters and headquarters company commander assists the engineer battalion commander in designating the location of the headquarters and headquarters company operations center. The company provides the necessary sustainment functions for the battalion to successfully accomplish the mission. The location of the company is directed by the battalion commander. The company units (not including detachments) receive their missions from the battalion commander.

Battalion Headquarters

1-27. The engineer battalion headquarters consists of a command section and staff sections. Staff sections consist of the manpower and personnel staff officer (S-1), S-2, operations staff officer (S-3), S-4, and signal staff officer (S-6). The staff is capable of 24-hour operations for an indefinite period of time. The BEB main command post normally colocates with the BCT main command post to establish future and current operations and planning cells. The staff sections describe their setup in a tactical standard operating procedure (SOP). The BEB tactical command post center usually colocates with the BCT tactical action center.

Command Sections

1-28. The battalion command section consists of the commander, executive officer, and command sergeant major. In coordination with the commander, this section exercises mission command over subordinate companies, elements, and staff sections. The command section ensures that subordinate elements are provided with administrative and logistics support within the capabilities of the organization. It also ensures that attached units are integrated into the battalion structure and supervises training and mission preparation.

Manpower and Personnel Staff Officer Sections

1-29. The S-1 is responsible for personnel administration and for the management of military occupational skills within the battalion. The cross-leveling of specialized skills is difficult; therefore, the S-1 must secure replacements in a timely manner. Other functions of the S-1 include—

- Monitoring and analyzing personnel strength and projecting future personnel requirements.
- Requesting, receiving, processing, and delivering replacement personnel.
- Managing casualty affairs.
- Planning and supervising morale support activities, awards, and discipline actions.
- Providing personnel service support, including finance and postal services.
- Coordinating legal services through the brigade legal section.
- Providing public affairs functions when a public affairs team or detachment is not attached.

Intelligence Staff Officer Sections

1-30. The S-2 focuses on a designated area of intelligence responsibility and conducts the collection and analysis of threat forces (particularly engineer) and activities in the area of intelligence responsibility. The S-2 is also responsible for recommending tasks for the MI company to the BCT S-2. The BCT S-2 focuses on intelligence throughout the BCT area of operations and area of interest. While the engineer battalion S-2

mirrors the focus of the BCT S-2, their analysis has greater focus on engineer missions, signal support, and other enabler tasks of subordinate units from the BEB. Significant S-2 functions include—

- Coordinating with the BCT S-2 and ABE during IPB for staff planning, decisionmaking, and targeting while focusing on the battalion sustainment area.
- Coordinating with the BCT S-2 and ABE and recommending priority intelligence requirements for the battalion commander's critical information requirements.
- Serving as the battalion collection manager (nominating collection tasks for battalion collection assets to the S-3).
- Coordinating directly with the BCT S-2 on local intelligence collection, analysis, and management.
- Providing information that fulfills the battalion commander's priority information requirements.
- Monitoring and maintaining the current situation regarding local enemy and environmental factors.
- Updating IPB information and the intelligence estimate.
- Identifying and evaluating intelligence collection capabilities as they affect area of operations security, countersurveillance, signal security, and protection (including backbriefs from patrols and enemy prisoner of war interrogation information).

1-31. As part of the S-2 staff, the CBRN noncommissioned officer provides technical advice to the battalion commander and battalion staff. The CBRN noncommissioned officer also—

- Predicts and templates contaminated areas and effects of enemy CBRN strikes.
- Disseminates information received via the CBRN warning and reporting system.
- Recommends—
  - Monitoring requirements.
  - The mission-oriented protective posture.
  - Operational exposure guidance requirements.
  - Other related activity requirements.
- Acts as the liaison between assigned and attached CBRN units and the battalion S-3 and S-4.

Operations Staff Officer Sections

1-32. The S-3 is the principal staff element that is responsible for training, operations, and plans. The S-3 assists the ABE in describing the terrain management plan within the BCT area of operations and in developing the scheme of engineer operations. This section also monitors and tracks each organic and attached element, regardless of their location or command relationship with another unit. Normal functions of the S-3 include—

- Preparing, coordinating, authenticating, publishing, and distributing the tactical SOP, operation orders (OPORDs), fragmentary orders, warning orders, and other products involving contributions from other staff sections.
- Reviewing and coordinating subordinate plans and actions.
- Coordinating and directing terrain management (mobility, countermobility, and survivability) .
- Recommending priorities for allocating critical command resources and support.
- Coordinating and synchronizing the employment of BEB assets in support of the BCT maneuver plan across the BCT area of operations.
- Assisting the commander directly in controlling, preparing for, and executing operations.
- Staffing, executing, and supervising operational security.
- Coordinating civil military operations when augmented.
- Providing overwatch and supervision to fire support noncommissioned officers in planning and preparing for sustainment area fires.
- Coordinating requests for Army aviation and close air support.
- Coordinating with the commander, executive officer, and S-6 to establish, oversee, and supervise battle staff information management activities of the command post.

- Coordinating fires for scatterable mines for the BCT-assigned area of operations.
- Planning and coordinating for ammunition and demolition.

Logistics Staff Officer Sections

1-33. The S-4 is the primary staff element responsible for coordinating the integration of supply, maintenance, transportation, and services for the battalion and augmenting units. The S-4 supports many different and complex, low-density unit requirements in the battalion, particularly in repair parts procurement and highly technical, contractor-supported equipment maintenance. This section monitors the activities of the headquarters and headquarters company support platoon in feeding, fueling, performing maintenance, and providing logistics support within the battalion. The S-4 is also responsible for—

- Projecting requirements and coordinating classes of supplies (except Class VIII [medical]) with the BCT or battalion S-3 and higher and lower sustainment staff according to the commander's priorities.
- Monitoring and analyzing the equipment and logistics readiness status within the battalion.
- Developing and synchronizing sustainment plans (supply, transportation, maintenance, services).
- Developing the internal logistics estimate.
- Informing the staff of mission supportability from an internal logistics viewpoint.
- Acquiring and assigning facilities.
- Managing the property book and ensuring that the command supply discipline program is integrated.
- Working with the BCT S-4 to manage engineer-specific Class IV and V material for the BCT.

1-34. In conjunction with the S-3, the S-4 prepares the unit administrative movement order. The S-4 develops and maintains administrative movement plans for all modes of transportation. Unit movement plans include—

- Security requirements.
- Logistics coordination requirements.
- Vehicle, aircraft, and railcar load plans.
- Unit movement personnel duties.
- Transportation document preparation.
- Transportation packaging and marking requirements.
- Outsized or unusual cargo descriptions (weight, length, width, height).
- Contingency and spill response planning, equipment, and reporting requirements.

Human Intelligence Staff Officer Sections

1-35. The S-6 is primarily responsible for internal communications, including network management, information dissemination management, communications equipment, and information assurance. The S-6 also coordinates directly with the BCT S-6 on brigade communications planning. Other duties of the S-6 include—

- Advising the commander on communications requirements.
- Establishing, managing, and maintaining communications links.
- Planning and coordinating network terminals.
- Determining system requirements needed for support based on the tactical situation.
- Informing the commander of primary and alternate communications capabilities.
- Recommending database configurations.
- Establishing and enforcing network policies and procedures.
- Preparing signal estimates.
- Advising the commander and other users on the requirements, capabilities, and uses of available systems.
- Coordinating signal interfaces with those not operating with Army battle command systems.

- Monitoring the status of engineer battalion communications assets (including network equipment that is installed, operated, and maintained by the section) and other general-purpose, user-operated systems.
- Coordinating signal requirements for units that are attached to, or under the operational control of, the engineer battalion.
- Integrating the communication of attached units.

Company Headquarters

1-36. The headquarters company commander assists the battalion commander in locating the engineer battalion tactical operations center. The company headquarters consists of the commander, executive officer, first sergeant, and supply section. The company provides sustainment functions for the engineer battalion to successfully accomplish the mission.

Chemical, Biological, Radiological, and Nuclear Reconnaissance Platoons

1-37. The CBRN reconnaissance platoon provides the brigade with CBRN reconnaissance and surveillance. The platoon is assigned to the engineer battalion headquarters and headquarters company. The CBRN platoon is also capable of gathering samples for follow-on analysis. The CBRN platoon has a limited ability to perform multiple missions simultaneously. The armored BCT platoon is equipped with a CBRN sample collection vehicle and is capable of collecting CBRN samples while mounted in the vehicle. The platoon in the infantry BCT is equipped with up-armored, high-mobility, multipurpose, wheeled vehicles and is capable of chemical and radiological reconnaissance and surveillance. (See ATP 3-11.37 for additional information on reconnaissance and surveillance.)

Sustainment Medical Sections

1-38. The sustainment medical section provides the battalion with an organic medical capability that is limited to Role II care to the BEB. The medical operations sergeant and the medical logistics sergeant (in coordination with the S-4) provides planning and oversight of Army health system support tasks. The medical operations sergeant is responsible for providing medical operations guidance and status to the commander and for coordinating the ordering, receipt, and distribution of Class VIII supplies within the battalion. This section coordinates with the brigade surgeon cell for the health services and technical and support issues that affect the battalion. (See ATP 4-02.3 and FM 4-02 for additional information.)

Sustainment Unit Ministry Teams

1-39. Commanders provide opportunities for the free exercise of religion through chaplains and chaplain assistants. The chaplain is a personal staff officer who advises the commander and staff on religion, morals, morale, and ethical issues within the command and throughout the operational environment. Army chaplains and chaplain assistants form a unit ministry team at the brigade level and below and a chaplain section at EAB. Under the supervision of the chaplain, the chaplain assistant aids in religious support planning, preparation, execution, and training (movement, sustainment, rehearsals, survivability). (See ATP 1-05.01, ATP 1-05.02, ATP 1-05.03, FM 1-05, and FM 6-0 for additional information.)

ENGINEER COMPANIES

1-40. Two engineer companies provide the BCT with the minimum capability to support offensive and defensive tasks during decisive action, including—

- Bypassing, marking, and breaching obstacles.
- Assisting in the assault of fortified positions.
- Emplacing obstacles to shape terrain.
- Constructing or enhancing survivability positions.
- Conducting route reconnaissance and information collection.
- Identifying and clearing explosive hazards.

1-41. Engineer companies help maintain the BCT freedom of maneuver and inhibit the enemy ability to mass and maneuver. Each company is slightly different, but the primary focus is to support the combat engineering discipline with limited mobility, countermobility, and survivability capabilities. The company integrates itself to a supported task force when a command support relationship is established and provides the supported unit with a capability briefing of resources. Engineer companies are not normally held in reserve and can be cross task-organized internally to the BCT to meet mission requirements.

Company A

1-42. Company A provides combat engineer support and consists of a company headquarters, two combat engineer platoons, and one engineer support platoon. The company provides mobility, countermobility, and survivability and limited construction support to the BCT. Combat engineer platoons provide the BCT with assets for breaching and emplacing obstacles. The engineer support platoon consists of a platoon headquarters, a horizontal squad that provides specialized engineer equipment to support limited general engineering tasks assigned to the company, and a breach squad that provides specialized equipment to support mobility, countermobility, and survivability tasks assigned to the company. In a Stryker BCT, company A has a company headquarters, two combat engineer platoons, a horizontal squad, and a bridge section. The breach squad of the Stryker BCT is limited to mine-clearing line charges and proofing equipment in the company. The Stryker BCT has a Volcano. The infantry (airborne) BCT has a rapidly emplaced bridge system.

Company B

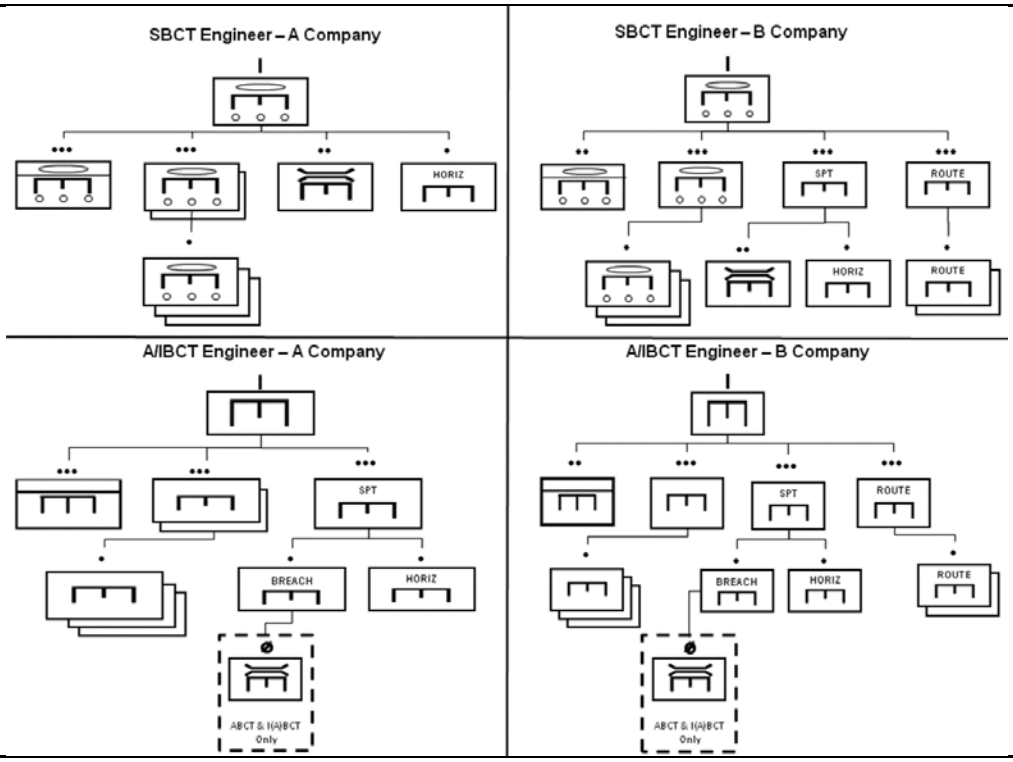
1-43. Company B is slightly different in armor, infantry, infantry (airborne), and Stryker BCTs. Company B is generally of the same composition as company A, but it has an additional route clearance platoon. This platoon provides the detection and neutralization of explosive hazards and reduces obstacles along routes that enable force projection and logistics. This route clearance platoon can sustain lines of communications (LOCs) as a member of the combined arms team or autonomously in a permissive environment. The armor and infantry organization for this company is organized the same; however, the breach section contains different equipment and capabilities. The breach section consists of bridging, whereas the infantry BCT and infantry (airborne) BCT breach sections consist of mine-clearing line charges. The infantry BCT currently does not have a bridging capability and requires augmentation from EAB engineers if the capability is required. The infantry (airborne) BCT has a rapidly emplaced bridge. The Stryker BCT has a Volcano. (See figure 1-2, page 1-12.)

MILITARY INTELLIGENCE COMPANIES

1-44. The MI company consists of a headquarters element, an analysis and integration platoon, a multisensor ground (MSG) platoon, and a tactical unmanned aerial system (TUAS) platoon. The company is assigned to the engineer battalion and is the responsibility of the battalion for mission tasking. The company provides analysis and integration support to the BCT S-2 section and has the additional capability to coordinate and execute tactical human intelligence (HUMINT) activities. The company usually has an attached U.S. Air Force weather section. In all actions, the BCT commander's critical information requirements drive the information collection effort.

Analysis and Integration Platoons

1-45. The MI company analysis and integration platoon conducts the threat analysis, situation development, target development, and battle damage assessment in support of the BCT S-2 section. The analysis and integration platoon consists of the situation and target development section; intelligence, surveillance, and reconnaissance (ISR) requirements section; common ground station section; and secure communications team. The platoon gathers, analyzes, and fuses information from multiple echelons and sources to produce intelligence products that meet the BCT commander's decisionmaking and planning requirements. The platoon uses combat information, targeting data, and intelligence from BCT ISR resources to develop an accurate and timely intelligence assessment of the threat and environment.



Note: The ABCT or IBCT combat engineer companies shown are generic. Add the appropriate modifier(s) to the basic function symbol for the brigade combat team affiliation.

Legend:

ABCT	armored brigade combat team
horiz	horizontal
IBCT	infantry brigade combat team
SBCT	Stryker brigade combat team
spt	support

Figure 1-2. Engineer companies

Situation Development Teams

1-46. The situation development team develops the current threat picture for the common operational picture of the BCT area of operations and area of interest. The common operational picture is a single, identical display of relevant information shared within the BCT that assists echelons in achieving situation awareness. The situation development team uses collaborative, analytical, and visualization tools to integrate information from many sources to populate the common operational picture with current information. Coupled with the S-2 planning product, the S-2 operations team uses the current situation picture of the situation development team to verify predicted threat COAs and intentions. The situation development team works with the disposition development team and the TUAS and MSG to ensure that all elements are aware of the current threat situation.

Target Development Teams

1-47. The target development team conducts target development and battle damage assessment in support of the BCT S-2 section and the BCT fire support coordinator. The team serves as the intelligence focal point for target development during the execution of operations by working directly with the effects coordinator to execute targeting missions and coordinate changes. The team uses gathered intelligence and the results of the military decisionmaking process (MDMP) to identify high-payoff targets. Target development requires the team to receive and process information on threat forces, facilities, and

capabilities. The team then places the information into an accessible database and presents it in a graphic format. The target development team assists in the development of the most accurate combat assessment possible by accessing multiple sources and source analyses results.

Intelligence, Surveillance, and Reconnaissance Requirements Sections

1-48. The ISR requirements section assists the BCT S-2 and S-3 in developing, monitoring, and adjusting the BCT ISR effort. It participates in the BCT staff war-gaming and synchronization sessions to extract ISR requirements that answer the commander's decisionmaking and targeting needs. The section also works closely with the S-2 operations team to identify shortcomings in current and near-term ISR support. Using ISR requirements for current and future operations, the section recommends ISR collection plans, orders, and asset positions to deliver combat information, targeting data, and intelligence to the commander and staff. Specific ISR requirements section tasks include—

- Developing the priority intelligence requirement in cooperation with the BCT staff and subordinate battalion S-2s for the BCT S-2 to provide to the BCT commander for approval.
- Developing specific information requirements for each priority intelligence requirement.
- Developing multidiscipline, multiechelon, and cross warfighting function ISR tasks for inclusion into the BCT S-3 ISR plan.
- Requesting information from higher headquarters.
- Assisting the S-3 in coordinating the development and inclusion of ISR tasks into paragraph 3 of the OPORD.
- Coordinating the development and dissemination of Annex L of the OPORD.
- Managing requests for information to higher-echelon intelligence organizations.
- Providing the capability to focus ISR collection in support of the detection and assessment of the targeting effects on selected high-payoff targets.
- Ensuring that the intelligence architecture supports the collaboration, timely tasking and reporting, and presentation of ISR data.

Human Intelligence Sections

1-49. The HUMINT section conducts HUMINT collection and supports document and media exploitation in support of the commander's information requirements in the BCT area of operations. The HUMINT section consists of an operational management team and three HUMINT collection teams.

1-50. The operational management team—

- Provides technical guidance to the HUMINT collection teams that operate with the BCT maneuver battalions and cavalry squadron.
- Coordinates HUMINT collection requirements and supported unit operations with the S-2 planning cell team.
- Augments the BCT S-2 planning cell team when not controlling HUMINT teams.

1-51. HUMINT collection teams provide general support to the BCT or direct support to subordinate units based on METT-TC. In general support, the teams respond directly to tasking and mission guidance from the S-2 planning cell team, which functions as the coordinator for HUMINT and counterintelligence functions. In direct support, the HUMINT collection teams respond to the tasking and mission of the supported unit. In addition to standard HUMINT reporting channels, general support teams simultaneously send spot reports to units in the area of responsibility that may need the reported information. Regardless of the support relationship, HUMINT collection teams report operational information, including source data via the operational management team or directly to the S-2 planning cell team. The teams use interrogation, debriefing, and elicitation techniques and a limited document exploitation capability to collect actionable combat information. These HUMINT collection techniques support current and future operations through—

- Source operations.
- Interrogations of detained persons and enemy prisoners of war.
- Debriefings of displaced persons, refugees, and local civilians.

- Debriefings of unified action partners.
- Analysis findings of foreign documents using document and media exploitation.
- Liaisons with local law enforcement and foreign military security and intelligence services.
- Executions of force protection source operations.
- Collections and disseminations of handheld digital imagery and biometrics data.

Multisensor Ground Platoons

1-52. The MSG platoon provides the BCT with a fully adjustable, deployable, mobile, and responsive intelligence processing capability. The MSG can receive and store secondary imagery. It is capable of providing full imagery, message, and analytical interface with the defense common ground system (Army). The processing system allows operators to maintain and manipulate related intelligence and electronic warfare databases and to display the threat situation, sensor data, and database information in a graphic format. MSG communications components enable the system to simultaneously receive, process, and display data (annotated imagery, text, graphics) from multiple tactical, operational, and strategic collection assets. Sensor links and connectivity, including the joint surveillance target attack radar system, are available through the MSG.

Secure Communications Teams

1-53. The secure communications team maintains the technical health of the ISR analysis platoon all-source analysis system correlated database and the communications that support it. The team receives and processes incoming data and updates database files based on the direction of the situation development team senior analyst. Intelligence analysts provide access to multilevel, high-capacity communications links between BCT command posts, national centers, and other intelligence organizations outside the BCT area of operations. They use the Trojan special-purpose, integrated remote intelligence terminal system to pull intelligence products, receive and analyze routed direct downlinks, and access external databases to fuse with organically collected information.

Prophet (Electronic Surveillance) Sections

1-54. The Prophet section consists of a Prophet control team and two Prophet collection teams. The Prophet control team provides reports from Prophet collection to the BCT S-2 for inclusion into the overall all-source intelligence products of the commander and staff. Prophet collection teams can detect, locate, and track threat communications emitters.

Measurement and Signatures Intelligence Sections (Infantry Brigade Combat Team Only)

1-55. The measurement and signatures intelligence section provides a ground sensor capability that can detect individuals and vehicles on the battlefield. These sensors provide a collection capability that is most useful in areas where the infantry BCT has an interest but cannot deploy Soldiers. Ground sensors also alert other collection assets, such as scouts and TUASs, to possible enemy activity. Measurement and signature intelligence teams collect and report moving ground targets by using a combination of attended and unattended sensors.

Tactical Unmanned Aerial System Platoons

1-56. The TUAS platoon conducts near-real-time day and night imagery support to the BCT. It consists of a mission planning and control section and a launch and recovery section.

Mission Planning and Control Sections

1-57. The mission planning and control section operates ground control stations at the launch and recovery site, near a designated command post (often the BCT main command post). Remote video terminals receive near-real-time video and telemetry from the TUAS and are allocated based on METT-TC and the ISR plan. A remote video terminal is normally provided to the brigade S-2 section and possibly to the maneuver

battalion or cavalry squadron. The intelligence staff of the unit that receives a remote video terminal must provide a trained operator for its use. It is a receive-only terminal that cannot control the TUAS.

Launch and Recovery Sections

1-58. The launch and recovery section is positioned based on METT-TC. It may be forward on the battlefield in linear operations to achieve maximum effective range.

Tactical Unmanned Aerial System Platforms

1-59. TUAS platform and sensor payloads are constantly improving. Sensor payloads include electrooptical and infrared cameras. Onboard global positioning system instruments provide navigational information. Depending on the system used, the area covered by sensors will have certain limitations. TUAS sensors have a relatively narrow angle of coverage. Sensor capabilities are based on a variety of factors, including altitude, field of view, depression angle, sensor payload, and standoff range. The air vehicle provides coverage of a brigade area of interest for up to 4 hours at 50 kilometers (31 miles) from the launch and recovery site. The maximum range, which is limited by the data link capability, is 125 kilometers (78 miles).

United States Air Force Weather Sections

1-60. The MI company is usually augmented with a U.S. Air Force weather section that consists of one officer and one noncommissioned officer. The team provides detailed, tailored weather forecasting through the use of organic and external weather sources. The weather team location depends on the METT-TC.

BRIGADE SIGNAL COMPANIES

1-61. The brigade signal company supports the communication needs of BCT command posts. The company is assigned to the engineer battalion and is the responsibility of the battalion for mission tasking. It consists of a headquarters, a network support platoon, two network extension platoons, and a small command post support team. The company typically conducts collaborative planning for mission specifics with the BCT S-6.

Headquarters and Network Support Platoons

1-62. The headquarters and network support platoon consists of the company headquarters section, a network operations section, a small command post support team, a retransmission team, and a communications-electronics (C-E) maintenance support section. The company headquarters section provides command and control, logistics, and administrative support for the unit.

Network Operations Sections

1-63. The network operations section installs, operates, maintains, and defends the BCT command and control network. The network operations section establishes the network operations and security cell, operates closely with network extension platoons, colocates with network extension platoons, and is responsible for BCT network management and computer defense.

1-64. Network management personnel use information network management systems to configure, manage, and control the area common-user system, tactical Internet, and limited adjacent local area network. With these tools, the section can also perform frequency management and communications security functions for all three elements (area common-user system, tactical Internet, and combat net radio) of the BCT command and can control the ISR support network.

1-65. Computer defense personnel assure the availability, integrity, authentication, and confidentiality of friendly information and information systems. Typically, the greatest risk for network intrusion and integrity is from users within the network. Protection from user corruption is accomplished through efficient and comprehensive password and access management.

Small Command Post Support Teams

1-66. The small command post support team provides communications and data support to a command post as directed by the BCT commander. The team uses a small command post support vehicle equipped with a 2.4-meter (8 feet), auto-acquire, Kurtz-under band satellite communications terminal and data communications baseband equipment. The equipment is employed to provide secret data and voice-over-internet protocol connectivity over the time division, multiple-access satellite communications architecture.

Retransmission Teams

1-67. The retransmission team provides range extension and network relay support for the enhanced position location and reporting system (for those BCTs so equipped) and single-channel, ground and airborne radio system very high frequency–frequency modulation networks. The retransmission team is mission-critical to BCT mission command and may necessitate the commitment of forces for protection in the absence of an airborne communications relay package.

Communications-Electronics Maintenance Support Teams

1-68. The C-E maintenance support team utilizes a signal nodal maintenance plan that requires the operator-maintainer to reside at the system (joint network node) and perform field level maintenance. The C-E maintenance team facilitates troubleshooting and performs field level maintenance on other C-E equipment in the company. It also manages the company C-E prescribed load list stock. The C-E maintenance team evacuates to the BSB any network support company equipment that cannot be repaired at the unit level. Contracted personnel may also be used to augment the team.

Network Extension Platoons

1-69. Network extension platoons are resourced to provide connectivity to their assigned command posts. A network extension platoon consists of a joint network node team, a data support team, and a retransmission team. In BCTs equipped with terrestrial-based Force XXI battle command brigade and below, the network extension platoon includes an enhanced position location and reporting system, a network manager, and a gateway.

1-70. The joint network node section provides network equipment that enables command posts to use line-of-sight or beyond-line-of-sight systems. Joint network node equipment provides the connectivity between satellite and terrestrial systems. The joint network node system connects BCT command posts, brigade support areas, higher headquarters, Army forces, joint task forces, and sanctuary locations. Each system maintains the interface capability to terminate network circuits, provide data and battlefield video teleconference services, and interface with special circuits (such as the Defense Switched Network). The joint network node system provides network planning and monitoring for the BCT wide-area network.

1-71. The network extension section has traditional retransmission teams and gateway systems for enhanced position location and reporting system units.

FORWARD SUPPORT COMPANIES

1-72. The forward support company (FSC) provides sustainment support to maneuver, reconnaissance, and fires battalions. FSCs are assigned to the BSB, but they are generally task-organized to supported battalions. The FSC commander is responsible for executing the sustainment plan according to the supported battalion commander's guidance. The BSB provides technical oversight to each FSC. The BCT commander must ensure that staff and subordinate units understand FSC command and support relationships. If an engineer battalion augments the BCT, it should be accompanied by the appropriate sustainment element that is task-organized to the battalion and that augments the sustainment capabilities of the BSB. The company has the following subunits:

- Field feeding section.
- Distribution platoon.
- Maintenance platoon.

ANTIARMOR COMPANIES (STRYKER BRIGADE COMBAT TEAM ONLY)

1-73. The antiarmor company provides accurate, long-range, antiarmor fire support to enhance the lethality and survivability of the BCT. The antiarmor company suppresses, fixes, or destroys enemies at long ranges; allows forces to maneuver; and is typically integrated to provide overwatch of tactical obstacles.

ECHELON ABOVE BRIGADE ENABLERS

1-74. During offense and defense, the BCT requires augmentation through baseline elements that could include an engineer battalion headquarters. Other specialized engineering units and equipment may also provide mission-tailored engineer support when unique engineer capabilities are required.

ENGINEER HEADQUARTERS UNITS

1-75. The engineer headquarters unit is the basis for integrating engineer functions, elements, and capabilities from Army components. An engineer headquarters unit consists of a theater engineer command, an engineer brigade, and an engineer battalion. Each unit has a staff that allows the commander to provide mission command for assorted and various engineer organizations and that is capable of providing mission command for other selected nonengineer units to support multifunctional missions (such as combined arms breaching and combined arms gap-crossing operations). The theater engineer command provides mission command for assigned or attached Army engineer brigades and other engineer units and missions for the combatant or joint task force commander. The engineer brigade is an Army functional brigade and provides mission command for up to five engineer battalions at division and corps levels. The engineer battalion is typically found within the engineer brigade or maneuver enhancement brigade or in support of a BCT. USACE may task-organize a forward engineer support team for specified areas in which other engineer organizational capabilities or capacities (such as water well drilling or structural engineering expertise) do not exist.

1-76. When in support of a BCT, an engineer battalion typically conducts engineer missions and controls up to five mission-tailored engineer companies. The engineer battalion headquarters is capable of providing mission command for combat or general engineering missions when they have been task-organized to perform in these roles. The battalion may be focused on a single mission, such as route clearance, security construction, or cache interrogation and reduction. The engineer battalion may also be task-organized to perform as a breach force command when the BCT is conducting a combined arms breach. During a gap- or river-crossing operation, the engineer battalion may be designated as the crossing-site command. When conducting construction or explosive hazards clearance missions, the battalion receives construction design, survey, or explosive hazards teams to facilitate these missions, in addition to the capacity already held by the battalion. The battalion may be task-organized to do all three at the same time or during the same activity.

ECHELON ABOVE BRIGADE ENGINEERING UNITS

1-77. Engineering units include combat and general engineering units. (See table 1-1, page 1-18.) They are the primary building blocks for the organization of most engineer battalions. These units are used to augment the organic engineer capabilities of a BCT and may be task-organized under an engineer battalion headquarters to serve under a variety of larger headquarters, providing the specific tailored capabilities needed to support particular mission requirements.

SPECIALIZED ENGINEER UNITS

1-78. Specialized engineering units are a variety of low-density engineer forces that provide the remaining category of engineer support. They are technically focused units that provide support at the tactical level.

Table 1-1. Operating-force engineers

Engineer Elements			*Component*		
			Regular Army	*ARNG*	*USAR*
Organic engineer units		BEB	X	X	
		Brigade combat team engineer company	X	X	
		Geospatial engineer team	X	X	
Force Pool	Engineer headquarters units	Theater engineer command			X
		Engineer brigade headquarters	X	X	X
		Engineer battalion	X	X	X
	Baseline engineer units	Sapper company	X	X	X
		Mobility augmentation company	X	X	X
		Clearance company	X	X	X
		Engineer support company	X	X	X
		Horizontal construction company	X	X	X
		Vertical construction company	X	X	X
		Multirole bridge company	X	X	X
	Specialized engineer units	Survey and design team	X	X	X
		Mine dog detachment	X		
		Concrete section		X	X
		Asphalt team		X	X
		Firefighting team	X	X	X
		EH team or coordination cell		X	X
		Diving team	X		
		Topographic company or platoon	X	X	
		Geospatial planning cell	X		
		Construction management team	X	X	X
		Engineer facility detachment		X	X
		Engineer utilities detachment		X	X
		Prime power company*	X		X
		Technical rescue company	X		
		Well-drilling team		X	
		Quarry platoon			X
		USACE real estate team*			X
		Forward engineer support team–main*			X
		Forward engineer support team–advance*	X		X
		Area clearance platoon		X	X
*Assets of USACE					

Table 1-1. Operating-force engineers (continued)

Legend:	
ARNG	Army National Guard
BEB	brigade engineer battalion
EH	explosive hazards
USACE	United States Army Corps of Engineers
USAR	United States Army Reserve

Engineer Battalions

1-79. The engineer battalion is capable of planning, integrating, and directing the execution of combat and general engineering missions that are conducted by up to five assigned engineer companies and must include a survey and design team. Engineer battalions are normally assigned to the engineer brigade, within the maneuver enhancement brigade, or in support of a BCT. When supporting a BCT, the battalion may be focused on a single mission; for example, route clearance or construction. The battalion may also be organized to perform as a breach force command during BCT combined arms breaching activities. During gap-crossing operations, the battalion may be designated as the crossing-site command.

Sapper Companies

1-80. The sapper company executes combat and general engineering tasks in support of BCTs and support brigades to enable force application, focused logistics, and protection. It often reinforces organic engineers in the BCTs. Sapper companies vary in design; however, all are organized with three sapper platoons. Airborne- and air assault-capable sapper companies have the unique ability to employ air-droppable, rapid runway repair kits in support of forcible-entry operations.

Mobility Augmentation Companies

1-81. The mobility augmentation company—

- Conducts assault gap-crossing operations.
- Conducts mounted and dismounted breaches.
- Emplaces obstacles in support of BCTs and support brigades to enable force application, focused logistics, and protection.

1-82. The mobility augmentation company is equipped with a variety of assault breaching and countermobility equipment. It is organized with two assault breach platoons and one obstacle platoon.

Clearance Companies

1-83. The clearance company conducts detection and limited IED neutralization along routes and within areas of support to enable force application, focused logistics, and protection. The clearance company provides mission command for three to five route, area, or sapper platoons.

Mine Dog Detachments

1-84. Mine dog detachments support the BCT by providing a unique explosive hazards detection capability. (See ATTP 3-39.34 for additional information on military working dogs.)

Engineer Support Companies

1-85. The engineer support company provides rapid runway repair, constructs TUAS airfields and landing zones, performs initial base camp construction, and repairs and maintains ground LOCs. An engineer support company is equipped with a variety of earthmovers and is organized with two rapidly deployable, light equipment platoons and one rapidly deployable, medium equipment platoon.

Multirole Bridge Companies

1-86. The multirole bridge company is required for hasty crossings of gaps greater than 18 meters (59 feet). One or more multirole bridge companies are required to support deliberate gap-crossing (wet or dry) operations. The multirole bridge company is organized with a company headquarters, two bridge platoons, and a support platoon. The company has maintenance, equipment park, and mess sections that allow it to function as a single entity when performing gap-crossing operations. The company can be task-organized into several sections and spread across the BCT area of operations.

Horizontal and Vertical Companies

1-87. The horizontal company and vertical company have a construction focus and are capable of constructing, rehabilitating, repairing, maintaining, and modifying landing strips, airfields, command posts, MSRs, supply installations, building structures, bridges, and other related infrastructure aspects. These units may also perform repairs and limited reconstruction of railroads or water and sewage facilities. The basic capabilities of these construction units can be expanded significantly through the augmentation of specialized personnel and equipment to provide bituminous mixing and paving, quarrying and crushing, and major horizontal construction projects (highways, storage facilities, airfields). Additional augmentation could also include pipeline construction or dive support, depending on the type and scope of the construction mission.

Explosive Hazards Coordination Cells

1-88. The explosive hazards coordination cell manages the explosive hazards database and maintains a land mine database. The cell provides technical information on the mitigation of explosive hazards. Explosive hazards cell capabilities include—

- Establishing, maintaining, and sharing explosive hazards information within the joint operations area while assigned to the engineer brigade.
- Conducting a pattern analysis.
- Providing technical advice on the mitigation of explosive hazards.
- Investigating mine/IED/unexploded ordnance (UXO) strikes in hazard areas.
- Ensuring the accuracy of explosive hazards information distribution via the knowledge management system.
- Coordinating technical and tactical explosive hazards training for BCTs.
- Providing updated tactics, techniques, and procedures for route and area clearance.

Explosive Ordnance Clearance Agents

1-89. The explosive ordnance clearance agent (EOCA) is not an engineer unit, but rather a special engineer capability. EOCA personnel are combat engineers who are trained to perform limited identification and battlefield destruction of UXO as outlined in the EOCA identification guide and supplemental list of the EOCA ordnance (part of the ordnance order of battle) provided by the theater EOD commander. If the UXO is out of the scope of operations for the EOCA, EOD personnel must be called. EOCA personnel can assist EOD personnel in disposing of other explosive hazards as requested. Properly trained and certified EOCA personnel capabilities include—

- **UXO reconnaissance.** EOCA personnel are trained to perform a detailed reconnaissance of suspected UXOs.
- **UXO identification.** EOCAs can perform limited identification of the items listed in the EOCA identification guide and the supplemental EOCA ordnance list. Items that the EOCA cannot positively identify must be reported to EOD personnel.
- **UXO area marking.** EOCAs mark the UXO area according to the standard UXO marking system.
- **Protective works.** EOCAs can provide protective works to isolate a blast and fragmentation danger area of identified UXOs. EOCAs may provide an estimated blast and fragmentation danger area for items similar to, but not included in, the EOCA identification guide and

supplemental EOCA ordnance list. EOCAs advise the on-scene commander on recommended personnel and equipment protective measures. When the commander determines that certain personnel or equipment cannot be removed from the hazard area, protective works must be established to protect those personnel and assets from the effects of the UXO. EOCAs recommend and supervise the appropriate protective works to be completed.

- **UXO disposal.** EOCAs are authorized to destroy (by detonation) individual UXOs identified in the EOCA identification guide and supplemental EOCA ordnance list.
- **IED disposal.** EOCAs are authorized to blow-in-place single, munitions-based IEDs that are positively identifiable in the EOCA identification guide and supplemental EOCA ordnance list.

Note. The joint force commander is advised by the senior EOD commander, who creates and manages modifications to the joint operations area UXO supplemental list. Requests to modify the supplemental list are coordinated through the local EOD unit or explosive hazards team for approval by the CBRN cell, EOD group, or battalion staff. Any modification to the joint operations area UXO supplemental list is provided based on positively identifiable munitions in the theater ordnance order of battle.

NONENGINEER ENABLER UNITS

1-90. Decisive action requires the BCT to be augmented with nonengineer units. These units may include military police, CBRN, civil affairs, EOD, MISO, or other capabilities.

Military Police Companies

1-91. A military police company may be task-organized to the BCT. The BCT provost marshal is responsible for coordinating military police assets and activities for the brigade. The company possesses the capability to perform military police disciplines, security and mobility support measures, police operations, and detention operations. A police intelligence operation is an integrated function that is conducted throughout military police operations. The company is self-sustaining in a field environment, but it relies on the supported unit for logistics support, including Class III products and maintenance. The military police company has the ability to protect itself or to be included in the defense plan of a larger base or base cluster; however, the tactical mobility of the company is usually best utilized by assigning security and mobility support missions to the military police companies within the BCT area of operations. Because of their extensive police training and law enforcement missions, military police assets are skilled in the use of force (the employment of lethal and nonlethal technologies), information collection and dissemination, observation and surveillance, and crowd control. In collaboration with the military police company commander or executive officer, the provost marshal conducts the technical planning that is necessary to employ the company. Unlike most combat arms units that maneuver together, the military police platoon usually operates independently and is dispersed over a wide area. (See FM 3-39 for additional information on the employment of military police capabilities.)

Chemical Companies (Maneuver Support)

1-92. The CBRN company (maneuver support) is employed as a company in support of a BCT or other designated force. It consists of one reconnaissance platoon that can perform three independent, mounted reconnaissance and surveillance missions. It also consists of three light decontamination platoons that can perform up to nine simultaneous, operational decontamination sites or maintain a single, thorough decontamination site without augmentation. This company is also capable of providing organic sustainment (supply, maintenance, recovery, limited field feeding, personnel support).

Civil Affairs Companies

1-93. The civil affairs company provides deployable, regionally aligned civil affairs generalists in support of the BCT and consists of a headquarters, a civil-military operations center, and five civil affairs teams. The company provides command and control, staff planning, and supervision of company operations and administration and maintains an organic equipment capability to deploy with and support rapid-deployment

conventional and special operations forces (SOF). It provides the organization, command authority, and staff with the capacity to execute company missions. It also provides civil-military operations planning expertise to supported commands and offers regional linguistic and cultural expertise to supported units. The company commander works closely with the BCT civil affairs and civil-military operations officer on the BCT staff.

Explosive Ordnance Disposal Companies

1-94. The EOD company provides direct support to the BCT throughout unified land operations. EOD units are the only forces that are specifically chartered, trained, and equipped to render-safe explosive ordnance, including munitions containing explosive and nuclear fission or fusion materials or biological and chemical agents. While other forces in support of the BCT have a limited capability to detonate or blow-in-place UXOs or IEDs, they are not properly equipped, trained, or authorized to perform render-safe, disruption, or exploitation procedures. EOD is not usually used during breaching operations. (See ATP 4-32 for additional information on EOD support to the BCT.)

Military Information Support Operations

1-95. The MISO detachment provides the BCT commander with the capability to execute a MISO plan according to higher command plans and intent. Planning is coordinated and developed by a MISO planner on the BCT staff. The detachment augments the MISO planner, who is organic to the BCT, and assists in developing plans to best support the BCT commander's intent. The detachment is organized into three or four tactical MISO teams, with each team consisting of three personnel. The organization uses Army standard equipment (with the exception of vehicle and man-pack loudspeaker systems) and electronic news-gathering kits. Each team member is trained on this equipment to conduct initial troubleshooting and repair. The MISO detachment is tasked through mission command channels based on the task organization.

SISTER SERVICE ENGINEER CAPABILITIES

1-96. Each Service has baseline engineering units and capabilities that stem from traditional roles and associations to meet specific operational needs and to support the accomplishment of a variety of mission requirements in an operational environment.

1-97. The engineering capabilities of each Service component may provide engineering support to other components to meet joint force requirements. (See JP 3-34 for additional information on other Service engineer capabilities.)

MARINE CORPS ENGINEERS

1-98. The primary tasks of the Marine Corps engineer are combat engineering and limited general engineering in support of Marine air-ground task forces. The Marine Corps has limited geospatial engineering capabilities that reside in the intelligence branch of the Marine Corps, with one topographic platoon supporting each Marine expeditionary force.

NAVY ENGINEERS

1-99. Navy construction battalion engineers, also known as Seabees, organized under the naval construction force, have rapidly deployable, general engineering units of various sizes and configurations that are tailored to provide responsiveness and flexibility. Seabees provide advanced base construction, including—

- Airfields.
- LOCs.
- Maintenance upgrades.
- Battle damage repairs.
- Underwater and amphibious structures.
- Logistic facilities.

1-100. Navy engineers also provide engineering support to the Marines at various levels, including functioning as a major subordinate command to a Marine air-ground task force. The Navy does not have combat engineers.

AIR FORCE ENGINEERS

1-101. The primary tasks for Air Force engineers are enabling rapid global mobility for airlift, bombers, and fighters and supporting other manned and unmanned aerial weapon systems. Air Force engineers are trained and equipped with organic capabilities to support airfield operations in which heavy strategic airlift, bombers, or fighters operate on a daily or frequent basis. The Air Force has the capability to rapidly deploy general engineering units that are organized as part of an air and space expeditionary task force to open, establish, and maintain airbase power projection platforms. These same units can deploy as detached units that operate in support of specific missions and operational tasks, including—

- Airfield pavement evaluation.
- Crash and fire rescue.
- EOD.
- Emergency management response.
- Airfield damage repair.
- Facility construction and maintenance.
- Utility system construction and maintenance.
- Aircraft arresting system installation and maintenance.
- Airfield lighting and marking.
- Navigation aid installation.

1-102. Organized as Prime Base Engineer Emergency Force (Prime BEEF) and Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer (RED HORSE) units, they provide a broad array of general and geospatial engineering capabilities.

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Chapter 2

Engineer Integration

Engineer commanders and planners must understand the resource limitations that are within the BEB task organization and request support from the EAB that is specific to maneuver element needs. Providing precise and timely engineer support across the BCT area of operations creates unique mission command challenges. Commanders and planners must understand this setting and the inherent mission command challenges that they face when integrating engineer capabilities into support operations. This chapter centers on the engineer application of organic and augmenting engineer units, engineer commanders, and engineer planners; discusses planning; and provides considerations for engineers as integrated members of the combined arms team. The construct and format for essential tasks for mobility, countermobility, and survivability and the engineer staff running estimate are highlighted to assist engineer planners in integrating engineers. This chapter also provides an overview of integrating processes and continuing activities and their contribution to the overall operations process.

MISSION COMMAND

2-1. Engineer leaders must ensure the effective mission command of engineer units. Engineer battalions in the BCT require augmentation that is not organic in their formations. They also require nonengineer organizations. This complex set of circumstances presents challenges that require engineer leaders and planners to coordinate across domains for nonengineer assets while accounting for engineer and other units from the EAB. Engineer unit commanders and planners must work together to ensure the effective control of engineers to facilitate their complete integration into combined arms activities. Command and support relationships are the basis for building task organization and provide the basis for ensuring the unity of command and unity of effort in operations. Typically, command is more decentralized during offensive missions than during defensive missions because critical engineer resources in the BCT are task-organized to maximize the efficiency of limited resources. The engineer commander's mission command system enhances the ability to conduct operations and exercise mission command. The mission command system supports decisionmaking and provides the means by which commanders communicate, collaborate, and facilitate the functioning of teams. Because of the potential complexity of engineer activities, the commander's mission command system takes on added importance.

2-2. A liaison officer (LNO), who is designated to a headquarters, facilitates the communication of common operational picture-related operational information between the sending and receiving headquarters. LNOs convey information and context by interpreting and explaining them. An LNO represents the commander or staff officer and can transmit information directly. LNOs can also expedite the passage of required information that answers the commander's critical information requirements and exceptional information. For example, an LNO from an engineer battalion task force headquarters that is in general support to the BCT could be provided to the BCT engineer planning staff during certain portions of the planning phase to provide subject matter expertise on potential general engineering requirements in the BCT area of operations.

COMMAND AND SUPPORT RELATIONSHIPS

2-3. Additional engineer units that augment the BCT are task-organized to the BCT in a command or support relationship, depending on mission requirements. Those units and the engineer units that are organic to the BCT may also be task-organized to a maneuver task force or the cavalry squadron or be

subordinate to a company or troop. Command relationships prescribe the supporting engineer unit chain of command.

2-4. Commanders establish support relationships when the subordination of one unit to another is inappropriate, usually when maximum flexibility is needed to rapidly move key engineer capabilities between multiple units. Command, administrative, and logistics responsibilities remain with the parent unit in a support relationship. The parent unit commander organizes the unit and allocates tasks to most effectively meet the needs of the supported commander. Support relationships are graduated from a supporting relationship between two units (typically, direct support in the offense) to a broad level of support that is extended to units under the control of higher headquarters (typically, general support typically in the defense). In a direct support relationship, the supporting unit answers directly to the supported commander's request for support. A direct support relationship is typically used when it is anticipated that a change to the engineer task organization may require the frequent shifting of an engineer unit to multiple locations. In a general support relationship, the supporting unit receives missions and support from a parent unit and the supporting unit aids the unit as a whole and not as a particular part or subdivision. A general support relationship is appropriate when central control and flexibility in employing limited engineer forces are required. Engineers in sustainment areas are typically employed by using a general support relationship.

COMMAND POST FUNCTIONS

2-5. Command posts are facilities for exercising mission command. Command post staff and equipment are arranged to facilitate coordination, the smooth exchange of information, and rapid decisionmaking. Well-designed command posts integrate command and staff efforts by matching command post manning, equipment, information systems, and procedures against the internal layout and utilities. Organizing the command post into functional and integrating cells promotes efficiency and coordination. Command post configurations and layouts vary between units and echelons. Units establish detailed SOPs to standardize command post operations. These SOPs must be followed and revised throughout training to ensure command post efficiency and ease command post personnel training. Similar to the BCT and supported maneuver battalions, the engineer battalion may choose to create sustainment-related command posts, such as combat trains posts or field trains command posts. (See FM 3-90.5 and FM 3-90.6 for additional information.)

2-6. The engineer staff is responsible for tracking information and making recommendations to the commander. The engineer staff—

- Receives subunit information.
- Distributes information horizontally and vertically.
- Analyzes information for relevance to engineer functions.
- Makes recommendations to the command.
- Integrates engineer resources and the resources that are assigned to the battalion.
- Synchronizes resources.

INFORMATION MANAGEMENT

2-7. Proper information management ensures that the commander receives relevant insight to make timely decisions that are shared by one of the four management components (people, process, tools, or organization). The staff must be able to predict these insights to enable the commander to make those timely decisions. The engineer role in information management is to provide the commander with engineer-specific insight based on knowledge and prediction. The purpose of the commander's critical information requirements is to help predict what the enemy will do. Key critical information management is derived from asking, "So what?" and "Who else needs to know?" The staff provides information to higher, adjacent, and lower organizations that provide a higher fidelity of the common operational picture of assets that are task-organized to the engineer battalion.

2-8. Engineer staffs incorporate the six tactical operations functions (receive information, distribute information, analyze information, make recommendations, integrate resources, and synchronize resources)

as part of the routine to inform the engineer commander of when decisions need to be made. Figure 2-1 depicts how staffs parse large volumes of information to present to the commander for decisions.

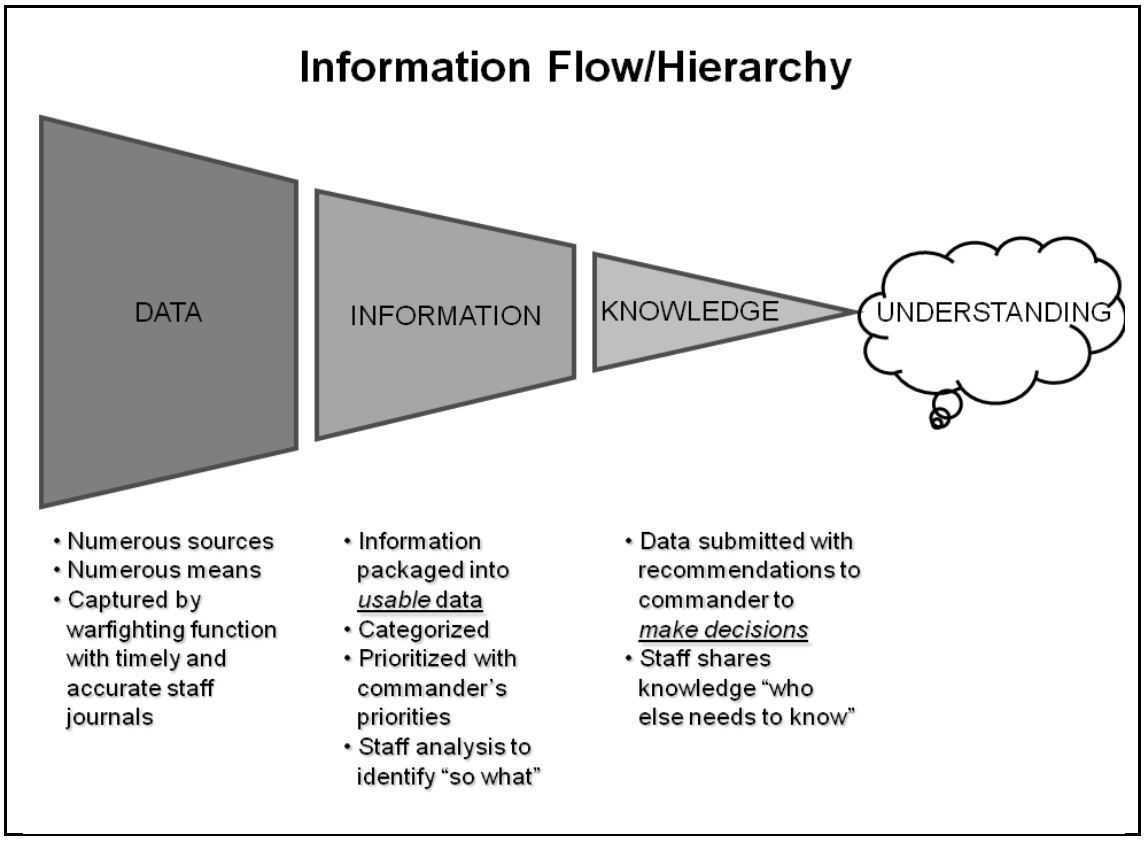

Figure 2-1. Data flow to knowledge

2-9. The commander applies judgment to relevant information to reach situational understanding. The potential volume of information that is provided to the commander could be overwhelming—adversely affecting sound and timely decisionmaking. Utilizing relevant information helps prevent information overload. The commander establishes the commander's critical information requirements to define relevant information to the staff.

BATTLE TRACKING

2-10. Battle tracking involves monitoring the common operational picture elements that are linked to forecasted outcomes. Each engineer command post that supports the BCT (organic or augmenting) is responsible for tracking the progress of the tactical tasks that are being executed. Because organic engineer company parent organizations differ between the types of BCTs, the information flow may differ. This tracking includes subordinate units.

2-11. EAB engineer units that augment a BCT are responsible for ensuring that the command post maintains a common operational picture of engineer work lines and engineer effort and tracks engineer execution, passing the information to the supported unit command post and to the next higher engineer organization or staff. When a supporting engineer battalion is task-organized to a BCT, it gathers reports from subordinate units and forwards the information to the BCT main command post.

2-12. Battle tracking for engineer forces includes, but is not limited to—

- Friendly and enemy engineer unit locations and combat power (personnel, equipment, supplies).
- Commander's critical information requirements status updates.

- Current and future engineer missions.
- Obstacle control measures.
- Planned and executed obstacles.
- Friendly and enemy survivability preparations.
- Obstacle locations.
- Friendly and enemy breach sites and lanes.
- LOC conditions.
- Gap-crossing site conditions.
- Engineer reconnaissance results.
- Barrier material availability and locations.
- Key engineer Class V (mines, mine-clearing line charge loads, 25-millimeter ammunition, explosives) stock levels.
- Critical infrastructure (sewer, water, electricity, academia, trash–medical, safety, cultural properties, other considerations assessments).

GEOSPATIAL SUPPORT

2-13. BCTs have an organic geospatial engineering team that performs the analysis, management, and dissemination of geospatial data and products in support of brigade planning, preparation, execution, and assessment. This team maintains the brigade common operational picture on the brigade server and provides updates to the brigade portion of the theater geospatial database. The team primarily supports the S-2 and S-3 (especially the ABE), but it also supports other staff and subordinate units as directed. The team works with the intelligence staff to fuse intelligence and geospatial information into a common operational picture for the commander. The brigade level team is too small to provide continuous support to the S-2, but it forms improvised geospatial intelligence cells as necessary to support operations. The geospatial engineering team requires access to the classified tactical local area network and Secret Internet Protocol Router Network to update and disseminate geospatial information and products. The geospatial engineering team has the capability to—

- Generate and analyze terrain data.
- Prepare decision graphics.
- Produce image maps.
- Provide three-dimensional terrain perspective views.
- Manage the theater geospatial database.
- Update maps.
- Produce tactical decision aids.
- Produce IPB overlays.
- Operate on a 24-hour basis.

2-14. Geospatial engineering provides commanders with terrain analysis and visualization, which improves situational awareness and enhances decisionmaking during planning, preparation, execution, and assessment. Some applications of tactical decision aids include—

- Promoting the timely development of the modified combined obstacle overlay during IPB to identify avenues of approach, mobility corridors, and choke points.
- Enhancing rehearsals with the use of three-dimensional fly-throughs or simulations.
- Facilitating the positioning and routing of ground and aerial surveillance assets through visibility analysis (intervisibility lines and flight line masking).

Chapter 3
Engineer Support to Combat

The engineer force provides mission-tailored capabilities to the BCT in all operations. The BEB task organization contains adequate support for initial entry and offense. As the operational environment develops, EAB units provide specialized support to conduct simultaneous engineer operations that are necessary in complex offense, defense, and stability operations across the engineer discipline. This chapter provides an overview of BCT offensive and defensive activities and discusses engineer considerations for the associated tactical requirements of each one. (See FM 3-90-1 for detailed information on offensive and defensive activities.)

TACTICAL ENABLING TASKS

3-1. Tactical enabling tasks are specialized missions that units plan and conduct to achieve or sustain a tactical advantage. Units execute these missions as part of decisive action. Alone, enabling tasks cannot ensure success; however, neglecting enabling tasks can result in mission failure. The fluid nature of the operational environment likely increases the frequency with which engineers, as part of a combined arms team, must execute tactical enabling tasks. Tactical enabling tasks include—

- Breaching. (See ATTP 3-90.4.)
- Gap crossing. (See ATTP 3-90.4.)
- Clearing. (See ATTP 3-90.4.)
- IED defeat. (See ATP 3-90.37.)
- Reconnaissance. (See FM 3-34.170.)

OFFENSIVE MISSIONS

3-2. Offensive missions are directed toward defeating, destroying, or neutralizing the enemy. A commander may execute an offensive activity to deprive the enemy of resources, seize decisive terrain, develop intelligence, hold an enemy in position, or facilitate other friendly operations. The offense tends to highlight the assured mobility framework and attack the enemy ability to influence operating areas and maintain mobility and momentum. Engineers in support of the offense focus on enabling movement and maneuver.

3-3. The engineer running estimate provides the framework for the engineer staff to synchronize and integrate engineer support into offensive missions. Conducting parallel planning is vital in allowing engineer units to position critical assets, establish linkup, and task-organize to their supported units. Early linkup with supported maneuver units provides critical time for combined arms planning and rehearsal. Engineer staffs at the appropriate echelon coordinate engineer reconnaissance to support the collection of necessary obstacle information and other technical information. They also coordinate the movement and positioning of required engineer augmentation assets (combat and general engineering).

3-4. Although general engineering assets can be placed in command or support relationships with the maneuver force, task-organizing these assets directly to the combat engineering unit that is being augmented may be more effective. General engineering assets require additional time for the movement of heavy and wheeled equipment. Though the focus of supporting the offense is on mobility, there may be requirements for protective positions for artillery systems, aerial damage assessment systems, logistics positions, and stationary mission command facilities, especially during halts in the advance. During the early planning stages, terrain analysis teams can provide information on soil conditions, vegetative concealment, and terrain masking along marching routes to facilitate survivability for the force.

CHARACTERISTICS

3-5. Surprise, concentration, audacity, and tempo characterize successful offensive operations. Maneuver commanders sustain the initiative by aggressively committing forces against enemy weaknesses. Attacks are force- or terrain-oriented and facilitate defeat of the enemy or continuation of the attack. Maneuver commanders extend their attacks in time and space by engaging the enemy in depth and destroying key elements of the enemy force.

Surprise

3-6. An enhanced common operational picture and terrain visualization enable engineer commanders to achieve surprise because they better understand enemy defensive preparation. Engineers achieve surprise through obstacle reduction and the use of situational obstacles. They enable surprise by rapidly overcoming obstacles, thus increasing the force tempo.

Concentration

3-7. Engineers begin concentration planning by integrating geospatial products and predicting threat obstacles. This effort is further enhanced with the employment of engineer reconnaissance, which can provide the necessary obstacle information and other technical information for detailed planning. This allows the maneuver force (and the engineers that support them) to concentrate reduction assets and overcome obstacles or other impediments at the point of penetration as part of the maneuver unit breaching plan.

Audacity

3-8. Engineers who operate in a decentralized role and comprehend the commander's intent can execute boldly and assist in enabling success for the commander.

Tempo

3-9. Engineer speed and flexibility are crucial to the attack. Engineers conduct rapid mobility operations to keep the maneuver force tempo. The ability to quickly reduce, proof, and mark lanes through an obstacle in support of the maneuver unit is the engineer hallmark. The imperativeness of maintaining mobility and momentum is highlighted as forces focus on the fundamentals of avoid, neutralize, and protect.

TYPES

3-10. The four primary offensive tasks are movement to contact, attack, exploitation, and pursuit.

Movement to Contact

3-11. The priority for combat engineering support is typically mobility although it may rapidly shift to countermobility in anticipation of an enemy attack. Figure 3-1 shows engineer support to a movement to contact. Considerations for engineers are based on mission variables. The task organization of engineers for a movement to contact must balance task-organizing mobility capabilities with the lead element to optimize response time and tempo without increasing the level of risk to the mobility of the main body or limiting the ability to mass breaching assets against complex obstacles. Time and distance factors (based on the terrain) for employing engineer assets and the potentially extreme challenges of task-organizing on the move and linking engineers with maneuver units that may be in contact are significant considerations used in determining the ultimate task organization and positioning of combat engineer assets within maneuver formations. (See FM 3-90-1, FM 3-90-2, FM 3-90.5, and FM 3-90.6 for additional information.)

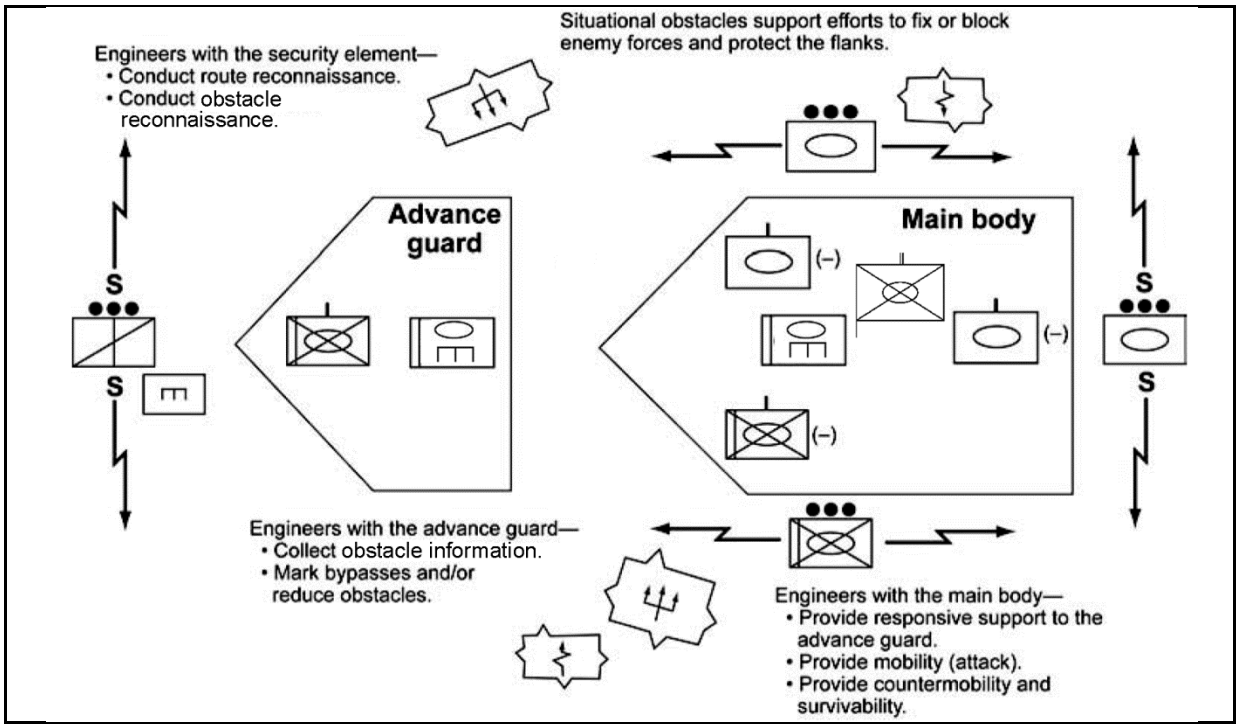

Figure 3-1. Engineer support to a movement to contact

Security Force

3-12. Engineers may augment the security force to reconnoiter obstacles and assist in gathering obstacle information to refine breach planning for follow-on forces. (See FM 3-34.170 for information on conducting engineer reconnaissance.)

Advance Guard

3-13. The composition of the advance guard is based on mission variables. Engineers may augment or follow lead elements to locate, bypass, or breach obstacles along the main body axis of advance to ensure the uninterrupted advance of the main body. Engineers use obstacle and combat information from the security force to facilitate breaching. The advance guard is usually the main effort until the main body is committed. Situational obstacles support efforts to fix or block enemy forces and must be carefully executed to avoid affecting friendly maneuver. (See ATP 3-90.8 for additional information on situational obstacles.)

Main Body

3-14. The main body contains the bulk of force combat elements, is arrayed to achieve all-around security, and bases its movement on that of the advance guard. Engineers located within the main body are poised to support its deployment and rapid maneuver to the decisive point on the battlefield to destroy the enemy.

Flank and Rear Guard

3-15. Flank and rear guard elements remain at a distance from the main body to prevent the enemy from surprising the main body with direct fires. Situational obstacles are used to help secure the flank. Obstacle control measures and clearly defined triggers are critical in effectively employing situational obstacles.

Attack

3-16. Engineer task organization depends on METT-TC and should occur early enough to ensure that adequate time is allowed for rehearsals with the gaining or supported unit. The employment of engineer reconnaissance as part of the ISR effort helps generate obstacle information, which provides a necessary detailed picture of the enemy situation. If breaching is anticipated, the breaching organization is established based on detailed reverse planning. The engineer priority of effort is toward mobility, with the priority of support toward the main effort. Countermobility effort (primarily through the employment of situational obstacles) is initially directed at supporting the isolation and fixing of enemy forces and protecting the flanks. Upon seizure of the objective and depending on the follow-on mission, engineers are prepared to conduct countermobility and survivability in support of a defense while mobility focuses on clearing obstacles or improving lanes to support friendly movement. (See FM 3-90-1, FM 3-90.5, and FM 3-90.6 for additional information.)

Exploitation

3-17. Exploitation is normally not conducted below the BCT level. The BCT (or higher-level unit) attacks rapidly over a broad front to prevent the enemy from—

- Establishing a defense.
- Organizing an effective rear guard.
- Withdrawing or regaining balance.

3-18. The BCT also—

- Secures objectives.
- Severs escape routes.
- Destroys enemy forces.

3-19. The exploitation mission demands a force with a significant mobility advantage over the enemy. Engineers support exploitation by breaching obstacles to facilitate the maneuver of ground forces, keeping supply routes open and emplacing situational obstacles to protect the flanks. (See FM 3-90-1, FM 3-90-2, FM 3-90.5, and FM 3-90.6 for additional information.)

Pursuit

3-20. A pursuit is not normally conducted at the BCT level unless it is augmented with additional aviation assets or ground maneuver units. When a pursuit is conducted, the goal is to fix the enemy between direct-pressure and encircling forces and then destroy it. Direct-pressure and encircling forces require engineers to be forward in movement formations to quickly breach obstacles that cannot be bypassed, ensuring unimpeded movement. Engineers also conduct countermobility and survivability tasks in support of the encircling force. Normally, commanders do not organize for a pursuit ahead of time, although they may plan for a pursuit as a branch or sequel to an offensive mission. (See FM 3-90-1, FM 3-90-2, FM 3-90.5, and FM 3-90.6 for additional information.)

SUSTAINMENT CONSIDERATIONS FOR THE OFFENSE

3-21. When preparing for the offense, engineer planners must consider several situations. For example, when a maneuver battalion changes from search and attack to an approach march or a hasty attack, large shifts in engineer sustainment plans are not normally required. However, other adjustments in operations, such as transitioning to the defense, may cause a significant change in sustainment focus or emphasis. Because of this, engineer planners must ensure that the supported unit S-4 sustainment plan is organized to help the sustainment executor be proactive regarding a change of mission without interrupting engineer-related sustainment. In planning offensive tasks, it is important to—

- Position vital, engineer-related sustainment supplies (explosives, Class III) within supported unit combat trains.
- Use air resupply when possible.
- Use previously planned and configured engineer logistics packages of supplies when possible.

- Plan for the resupply of Class V mine-clearing line charge and Volcano reloads.
- Plan for the resupply of lane-marking materials.
- Plan for increased engineer equipment maintenance needs.
- Use HN or captured enemy engineer supplies (especially haul assets for bulky Class IV and V supplies) when possible.
- Increase LOCs (air and ground) through mobility to support area of operations expansion, logistics traffic growth, and casualty evacuation. (Activities include engineer reconnaissance, route clearance, and forward aviation combat engineering.)
- Plan and prepare for replacements based on known and projected engineer losses.

FORMS OF MANEUVER

3-22. The maneuver commander selects the form of maneuver based on an analysis of mission variables. An activity that is dominated by offensive tasks may contain several forms of offensive maneuver. The five forms of maneuver are—

- Envelopment.
- Turning movement.
- Frontal attack.
- Penetration.
- Infiltration.

ENVELOPMENT

3-23. Engineer support priorities for envelopment include enabling the mobility of the enveloping force and providing protection for its extended flanks. Engineers plot known and predicted enemy obstacles to determine if there is an assailable flank. Breaching an obstacle system can provide the maneuver commander with the flank he needs; therefore, enemy obstacles and terrain must be adequately studied.

3-24. The maneuver force that makes up the enveloping force normally organizes for breaching. Once committed, the enveloping force must have the capability to breach unforeseen obstacles with minimal delay and maneuver. The following are critical to this ability:

- **Obstacle information gathered before the enveloping-force mission.** The engineer staff must ensure that engineers are integrated into the brigade information collection plan and within the cavalry squadron and battalion scouts as applicable.
- **Engineers who are task-organized to the enveloping force.** These engineers provide responsive, rapid, obstacle reduction capabilities and the ability to further task-organize forces to accomplish the mission.

3-25. Engineer task organization must provide flexibility and redundancy. The main effort cannot afford to wait for low-density equipment or units to be brought forward or replaced. Engineer planners can utilize the reverse-planning process for determining engineer task organization requirements in support of combined arms breaching.

Main Effort

3-26. Engineer support to the main effort is broken into separate areas that require dedicated engineer forces to—

- Provide mobility for the enveloping force.
- Protect enveloping-force extended flanks.
- Provide engineer support to protect enveloping-force flanks. (This support centers on situational obstacles that are planned at the brigade level.)

Note. Scatterable mine systems are key components for engineer support to the main effort.

3-27. A key aspect of mobility support to the main effort is maintaining the enveloping-force LOC. In envelopment, the LOC for the main effort can quickly become extended, shifted in response to the attack, or threatened by bypassed enemy units. Engineers who are organic to the BCT have a limited sustainment capability and rely on EAB assets for augmentation, which should be determined early in the planning phase.

Actions on the Objective

3-28. To provide engineer support to actions on the objective, the engineer staff must understand the enveloping-force mission. Fundamental to this understanding is the engineer involvement with the S-2 in the IPB process. Determining the task organization of engineer units to the enveloping force centers on the IPB process and the subsequent collection of information.

3-29. The mission of the enveloping force may be to attack and defeat or destroy a defending enemy force or reserve. The priority of engineer effort is still mobility. The task organization must provide attacking battalions with the capability to breach protective obstacles. However, the mission may be to secure key terrain that denies enemy use of LOCs. The enveloping force may then establish blocking positions; therefore, engineer support to actions on the objective may also require countermobility and survivability tasks. Organic engineer units can only provide limited survivability support. In these cases, the engineer staff (through war-gaming) ensures that the enveloping force has the assets to maintain mobility during the attack, protect the flanks, and establish effective blocking positions.

Fixing Force

3-30. Providing the necessary assets to the fixing force is the greatest challenge of the engineer staff. While the main effort of engineer support and the concentration of the engineer force are with the enveloping force, engineer requirements for the fixing force must not be discounted. When the envelopment is successfully executed, the fixing force is likely to be the only force required to breach extensive obstacles. More importantly, the success of the main effort may depend on the ability of the fixing force to penetrate prepared defenses and fix the enemy during the movement of the enveloping force. This causes the enemy to fight in two directions.

3-31. The engineer role in the fixing force is normally limited in scope because of support priorities to the enveloping force. The engineer staff carefully analyzes the requirements of the fixing force. This may require focusing on the maneuver plan (two levels down) through close coordination with the engineer and maneuver force commanders. The engineer staff often recommends that the maneuver commander accept a level of risk and allocate the minimum force necessary to accomplish mobility requirements; however, the engineer staff can reduce the level of risk by initially focusing obstacle information collection to confirm or deny assumptions made about the enemy situation facing the fixing force. Adequate engineer augmentation reduces the need to accept certain levels of risk.

TURNING MOVEMENT

3-32. The commander who directs a turning movement task-organizes resources into a turning force, a main body, and a reserve. Each of these forces executes security and reconnaissance. Given the appropriate mission variables, the turning force or the main body can conduct the echelon decisive action.

Main Effort

3-33. Engineer support to the main effort requires dedicated engineer forces to—

- Conduct engineer reconnaissance.
- Provide geospatial support.
- Provide mobility, including the reduction of obstacles.
- Protect the flanks.
- Provide countermobility and survivability on the objective.

3-34. A key aspect of mobility support to the main effort is maintaining the turning-force LOC. In a turning movement, the LOC for the turning force can quickly become extended, shifted in response to the attack, or threatened by bypassed enemy units. Engineers who are organic to the BCT have a limited sustainment capability and rely on EAB assets for augmentation.

Actions on the Objective

3-35. To provide engineer support to actions on the objective, engineers must understand the scheme of maneuver. Fundamental to this understanding is engineer staff involvement with the S-2 in the IPB process. Determining the task organization of engineer units to the turning force centers on the IPB process and the subsequent collection of information. Success of the turning movement implies the potential requirement to transition to the defense to support the maneuver force fight against counterattacking enemy forces.

3-36. If the BCT is the turning force, the supporting attack may be more of a follow-and-assume or follow-and-support force within the BCT axis of attack. As such, the possibility of shifting engineer assets is more possible than in a form of maneuver, such as in a frontal attack. Instilling flexibility within the task organization of engineer assets always presents a challenge to the engineer planner. The ability to transition from a focus on mobility to one of countermobility and then back to mobility is critical.

FRONTAL ATTACK

3-37. Engineers are involved with maintaining the mobility of the force, with little opportunity to shift engineer assets once committed. A commander who conducts a frontal attack also organizes the unit into an element for reconnaissance and security, a main body, and a reserve. Mission variables dictate the specific task organization. A frontal attack should typically include significant combat engineer augmentation. The supporting attack is likely to have many of the same engineer requirements (such as reducing obstacles) as the main attack.

Main Effort

3-38. Engineer requirements are associated with each element of this force, but they are also likely to be massed to ensure success of the decisive action. This is generally in support of the main effort. Engineer support to the main effort is broken into areas that require dedicated engineer forces to—

- Conduct reconnaissance.
- Provide geospatial support.
- Provide mobility, including the reduction of obstacles.
- Participate in a combined arms breach when required.
- Protect the flanks.

Actions on the Objective

3-39. To provide engineer support to actions on the objective, engineers must understand the frontal attack mission. When the attacking unit can no longer advance, it adopts a defensive posture. Whether on the objective or not, engineers must be able to rapidly transition to support the maneuver element defense activity. Determining the task organization of engineer units for the frontal assault centers on the IPB process, the subsequent collection of information, and an understanding of the intended scheme of maneuver for the force. Reverse planning should be conducted for anticipated combined arms breaching.

PENETRATION

3-40. A successful penetration requires the concentration of combat multipliers, including the use of night, stealth, and covered and concealed terrain. Penetrations have the following three stages:

- Breaching enemy main defensive positions.
- Widening the gap created to secure the flanks by enveloping one or both of the newly exposed flanks.
- Seizing the objective and its associated subsequent exploitation.

Main Effort

3-41. Engineers support penetration by providing the main effort with overwhelming mobility to rupture enemy obstacles. This remains the engineer priority of support until a penetration is achieved. It requires the engineer staff to mass obstacle reduction assets in the main effort. Penetration requires the rapid projection of combat power to maintain the momentum of the attack and quickly divide the enemy force. To do so requires the creation of more lanes along a narrower front than is normally associated with breaching; therefore, mass and redundancy direct engineer task organization to the main effort. Mass is commonly achieved by comparing the main effort to task-organized EAB engineer augmentation, based on the generally high number of essential tasks for mobility, countermobility, and survivability that is associated with the main effort.

3-42. The maneuver unit may use supporting forces or follow-and-support forces to widen penetration and improve breach lanes. The engineer staff must understand the commander's intent to ensure that forces have adequate engineer support. When a follow-and-support force is employed, it assumes the responsibility for widening the point of penetration and improving lanes. This may require a smaller, more centralized engineer organization to accomplish that task.

Countermobility

3-43. Depending on the enemy situation, countermobility may quickly become the priority of effort to help defeat counterattacks against lodgment. Follow-and-support forces are normally used to secure lodgment and defeat counterattacks; therefore, engineers must—

- Anticipate the size of the counterattack force.
- Analyze likely avenues of approach.
- Allocate the countermobility assets that are needed to disrupt or fix counterattack forces.

3-44. Engineer planners must design obstacle belts that permit the use of tactical and situational obstacles. Consideration must be given to future operations. The use of restricted obstacles allows the commander to limit or eliminate the use of obstacles that may impair future operations. Normally, these obstacle belts are developed and passed to battalions for planning; however, they are only active on the order of the brigade commander. Forces that secure lodgment require flexible, responsive obstacle capabilities, such as scatterable mines (Volcano, Gator, RAAM/ADAM, Modular Pack Mine System, Spider, Hornet). (See ATP 3-90.8 for additional information on countermobility.)

Exploitation

3-45. Once the objective is secured, the engineer priority shifts to assisting the force in exploiting its success by ensuring the mobility of exploiting subordinate units. To facilitate the exploitation, the engineer staff must ensure that the scheme of engineer operations allows for the rapid development of a lane network within the penetration. The lane network must support the uninterrupted forward passage of the reserve to subsequent objectives and the flow of sustainment to forces in the penetration. Once the force has passed through the lanes, responsibility is passed to outside forces to improve and maintain the lane network.

INFILTRATION

3-46. Infiltration requires extensive reconnaissance to be successful. Engineer aspects of reconnaissance include—

- Identifying the enemy disposition across the area to be infiltrated.
- Identifying infiltration lanes.
- Locating assault positions for the attacking force.
- Identifying enemy weaknesses.
- Observing enemy activities.

Intelligence Preparation of the Battlefield

3-47. Engineer reconnaissance assists the commander in determining the infiltration method, task organization, and infiltrating unit size. Obstacle information is collected to fulfill obstacle intelligence requirements. Reconnaissance is also vital in determining actual routes and the use of single or multiple infiltration lanes. Successful engineer support to an infiltration is predicated by careful, detailed terrain analysis by the engineer staff and engineer unit commanders.

3-48. Existing gaps in the enemy defensive system and the locations of enemy security elements must be identified. Natural and predicted enemy obstacles must also be considered. Engineers who infiltrate with the cavalry squadron and battalion scouts verify, report, mark, and reduce obstacles along infiltration lanes as required.

3-49. The engineer staff develops information requirements for inclusion in the S-2 collection plan. In addition, other information requirements are identified, specifically at the objective area (especially obstacle information). Engineer reconnaissance teams may be identified to support selected reconnaissance requirements. Examples of information requirements include the—

- Locations, types, densities, and employment methods of obstacles in and around the objective.
- Recommended location for the point of penetration.
- Potential breach lanes for attacking units.
- Level of survivability of enemy forces on the objective.
- Possible enemy counterattack routes in support of the objective.
- Critical infrastructure that needs protection.

Mobility

3-50. Mobility is the main focus of engineer units during an infiltration, with the priority of support to the main effort being along the infiltration lane. Due to the decentralized nature of the maneuver, providing task-organized engineer support to each infiltrating unit may not be feasible. Maneuver units must be trained and capable of executing mobility that is likely to occur on infiltration lanes. The requirement for dedicated support during the infiltration is minimized through—

- A detailed, predictive analysis by staff planners that is represented on an enemy situational template.
- Accurate and timely intelligence updates that are provided by engineers who work with scouts during reconnaissance.
- Detailed, combined arms rehearsals.

Actions on the Objective

3-51. To provide adequate support to maneuver battalions and the cavalry squadron during actions on the objective, detailed engineer planning at the brigade centers on war-gaming contingencies and transitions. Engineers may be task-organized to one or more maneuver battalions or the cavalry squadron in a command relationship during the infiltration and for subsequent actions on the objective. This ensures the maneuver commander's flexibility to further task-organize engineers and establish absolute control during the breaching that follows actions on the objective. Subsequent, on-order missions (defense) may dictate a change in the task organization of engineer units. The brigade staff may need to change from a command relationship to a support relationship with maneuver battalions or the cavalry squadron. This is done to speed up the response of engineer units and ensure responsive sustainment support.

Sustainment

3-52. Infiltrations often require clearing extended MSRs from the line of departure to the attacking force. MSRs become particularly vital when the objective is secured and the attacking force requires support (Class V resupply, ground medical evacuation, barrier material, engineer equipment, or situational-obstacle material) for a hasty defense. The infiltrating force bypasses obstacles and focuses on the enemy forces that may interdict high-speed avenues of approach and MSRs; therefore, the clearance of MSRs commonly resembles a small-scale linkup and is planned and resourced accordingly. Breaching is common during

MSR clearance. The BCT may need to rely on EAB engineer augmentation assets to provide the assets that are necessary to execute them.

ENGINEER SUPPORT TO SECURITY

3-53. Engineers must understand the five fundamentals of security operations. (See FM 3-90-2 for additional details.) The fundamentals are as follows:

- Provide early and accurate warning.
- Provide reaction time and maneuver space.
- Orient on the force or facility to be protected.
- Perform continuous reconnaissance.
- Maintain threat contact.

3-54. Planning for engineer support to activities involves each engineer discipline, although the focus remains on combat engineering (mobility, countermobility, and survivability). The amount and type of combat and general engineering support vary according to the type of mission and the mission variables. The geospatial engineering information and services that are provided may vary based on maneuver force requirements, but the requirement to include them for military operations remains constant. The amount and type of engineer augmentation are critical because the organic engineer capabilities of each BCT are limited and, in some cases, are lacking necessary engineer equipment or focused expertise. Common engineer tasks that support security include—

- Developing engagement areas.
- Developing a situational obstacle plan that is integrated with BCT decision points.
- Developing and executing a survivability plan.
- Planning and emplacing obstacles.
- Integrating fires with obstacles and the situational-obstacle plan.
- Occupying specific observation posts.
- Monitoring bridges, ford sites, point obstacles, and reserve demolition targets.
- Providing mobility support.
- Providing tactical bridging.
- Identifying key enemy engineer equipment, to include breaching assets.
- Supporting the forward or rearward passage of lanes (open and close passage lanes, mark lanes and passage points, and provide guides through passage points).
- Screening, which includes—
  - Conducting engineer reconnaissance.
  - Providing selected hardening to support survivability.
  - Improving combat roads and trails to support mobility.
- Guarding, which includes providing offensive priority of support for mobility, countermobility, and survivability.
- Covering.
- Providing operational area security, which includes—
  - Establishing a perimeter when the area being secured is not tied into an adjacent unit.
  - Screening along zones of separation or other designated areas.
  - Conducting route clearance.
  - Providing route security (route reconnaissance, route clearance, route maintenance).
  - Constructing checkpoints.
  - Maintaining an observable presence through demonstrations.

DEFENSIVE MISSIONS

3-55. Defensive missions are a prelude to the offense. Defensive plans should not be designed simply to resist enemy attack; instead, they should aim at reverting to the offense to decisively defeat the enemy. The defense seeks to defeat an enemy attack, buy time, economize forces, and develop conditions that are favorable for the offense. The engineer focus is on attacking the enemy ability to influence operating areas (countermobility through combined arms obstacle integration) and on supporting mobility for friendly repositioning or counterattacking forces.

3-56. Planning for the defense is inextricably linked to activities that are associated with the offense. For planning purposes, the transition from offensive activities to follow-on offensive activities must be considered. Many planning considerations for the offense also apply to the defense. The engineer running estimate provides the framework for synchronizing and integrating engineer support to the defense. (See ATP 3-37.34 and ATP 3-90.8 for additional information on countermobility and survivability planning.)

CHARACTERISTICS

3-57. The defending force arrives on the battlefield first and, with the help of engineers, utilizes the terrain to its advantage. Based on the higher commander's intent, maneuver commanders, the fire support officer, and the engineer site tactical obstacles to enhance the effects of direct and indirect fires on the enemy. Engineers provide technical expertise and advice to the commander on tactical obstacle emplacement. Fortifications allow fires from positions that best disrupt and destroy the attacker. Because of defending-force survivability, the defender can postpone the commitment of major forces until the attack develops and then strike the extended enemy over selected, prepared terrain.

3-58. Engineers provide combat engineering support to the defense. With this support, the force can position itself and fight from terrain where it otherwise could not survive. EAB engineer augmentation is typically required to support the intensive requirements for engineer support in the defense.

3-59. Preparation, security, disruption, massed effects, and flexibility characterize a successful defense. The mission of the engineer staff and engineer commanders is to plan and execute engineer missions that enhance the ability of the maneuver unit to combine fires and obstacles and to maneuver to destroy an attacking enemy. The development of an effective defensive plan requires the use of sequential planning and an understanding of defensive characteristics.

Preparation

3-60. Preparation of the defense includes planning, refining the plan, positioning forces, constructing obstacles and fighting positions, preparing other survivability requirements, planning and synchronizing fires, positioning logistics, and conducting inspections and rehearsals. To prepare for the defense, the commander must be familiar with the capabilities and limitations of the enemy. The terrain must be analyzed in detail from all perspectives and then verified from the ground. The commander then organizes the defense with a mixture of direct and indirect fire weapons that are directed at the enemy main threat. Capabilities of these weapons are enhanced by the terrain.

3-61. Engineers play an essential role in engagement area development. Based on the commander's intent, engineers emplace tactical obstacles to produce specific effects on the enemy. They also construct survivability positions that allow the maneuver unit to sustain the fight and protect mission command nodes. (See FM 3-90.6 for more information on engagement area development.)

3-62. Engineer success in the preparation phase depends on the ability of the engineer staff to conduct integrated planning with the combined arms staff. The engineer staff must identify engineer requirements in support of decisive action and shaping tasks, understand the capabilities of engineers and equipment on the battlefield, and determine the resources (manpower, equipment, and material) that are required and available to meet the demand. As described in ATP 3-90.8, obstacle control, intent, and resourcing are top-down driven (initiated by higher headquarters), whereas the process of integrating the actual obstacle location with fires is bottom-up driven (initiated by the subordinate or emplacing unit).

3-63. Engineer focus in the preparation phase is not limited to close combat in the main battle area. Each element of the defensive framework must be considered during engineer mission analysis and accounted for in the scheme of engineer operations.

Security

3-64. The security of the force is primarily provided through deception and physical means. In the defense, the friendly unit deceives the enemy by concealing strengths and weaknesses. Normally, a security force that is positioned between the enemy and the main body secures the main body. The purposes of this measure are to provide early warning and disrupt or delay enemy attack. Engineers who support the cavalry squadron and the security forces who operate under the control of the cavalry squadron focus on providing situational obstacles and sensors with the intent of disrupting or delaying enemy attack and providing early warning.

Disruption

3-65. The method that a commander chooses to use to achieve disruption varies with the situation, but the ultimate goal is to spoil attacker coordination. The engineer staff and engineer commanders work closely with the BCT and maneuver battalion staffs to ensure that combat engineering (mobility, countermobility, and survivability) functions are integrated into disruption activities, leveraging geospatial engineering capabilities to optimize their effects. Enemy reconnaissance efforts and probing attacks must be defeated without disclosing the defensive scheme of maneuver. Tactical obstacles are designed and emplaced to disrupt enemy formations and cause the enemy to move into desired engagement areas. This prevents the enemy from effectively concentrating mass against the defense.

Massed Effects

3-66. Engineers support the massing of effects by employing obstacles, constructing fortifications, and providing mobility to counterattack or reserve forces. The principal role of the engineer in massing effects is to ensure that tactical obstacles are integrated with defender fires to disrupt, turn, fix, or block enemy forces and to create effective engagement areas in which the maneuver commander intends to kill the enemy. These efforts, combined with fortifications (augmentation required) and protective obstacles, enhance the defense. The defending force must be able to direct its actions at the enemy from a survivable position.

Flexibility

3-67. Ultimately, flexibility requires that the commander visualize the area of operations to determine the enemy scheme of maneuver in adequate time to integrate the effects of fires and maneuver against it. Commanders must be able to counterattack and employ reserve forces at any time. Engineers assist in maintaining flexibility by—

- Using situational obstacles.
- Task-organizing for rapid transition to the offense.
- Providing necessary mobility and countermobility support to reserve and counterattacking forces.
- Improving or maintaining the routes that are needed to reposition forces within the defense.

TYPES

3-68. The three basic defensive tasks (mobile defense, area defense, and retrograde) are significantly different and must be dealt with differently during planning and execution. (See FM 3-90-1 for additional information.)

Mobile Defense

3-69. Engineer support to a mobile defense focuses on using obstacles to attack enemy maneuver and providing mobility to the striking force and reserve. Most countermobility and survivability assets support

the fixing force, while most mobility assets support the striking force. Obstacle zone planning received from the division and obstacle belt planning at the brigade level are directed at the most likely enemy COA rather than at the terrain. Belts are aimed at enemy maneuver in the brigade area of operations to support its destruction by counterattack. Therefore, obstacle belt planning is more restrictive to assure the mobility of the striking force. Situational obstacles are advantageous in the mobile defense by allowing the commander to exploit enemy vulnerabilities, exploit success, separate follow-on forces, and provide flank protection.

3-70. The survivability effort is uniquely tailored in a force-oriented defense. To create the conditions for a counterattack, battalions may need to use multiple primary and subsequent battle positions to fight throughout the depth of the area of operations. Although minimal protective-obstacle effort may be required forward as the defense is geared toward a proactive fight, protective-obstacle effort may occur at any point within the mobile defense. The protective-obstacle effort and, typically, the supporting fighting-position effort are concentrated where enemy penetration must be stopped to allow the counterattack to take place. Obstacle control measures ensure that battalion obstacle efforts do not affect the strike force ability to maneuver.

Area Defense

3-71. The focus of the engineer effort is on providing the maneuver commander with the ability to hold terrain while enabling maneuver units to concentrate fires from static positions. During area defense, engineer involvement in terrain analysis is vital. Engineers help to identify key and decisive terrain that supports the commander's concept of the operation, with a focus on where the commander wants to kill the enemy. During obstacle planning, obstacle control measures are designed to give maximum flexibility to subordinate units while focusing the tactical-obstacle effort on terrain retention. The engineer staff must advise the maneuver commander of the resource requirements of each subordinate unit based on the assigned essential tasks for mobility, countermobility, and survivability. They must coordinate through appropriate channels to ensure that the units are resourced accordingly.

3-72. The survivability effort in area defense must—

- Enhance the ability of the force to accurately concentrate fires from static positions into designated engagement areas.
- Provide the force with an increased level of protection from sustained effects of enemy fires.
- Deceive the enemy as to the exact location of the defense.

3-73. If the construction and implementation of engagement areas are successful, the enemy is forced to conduct assaults on the defensive positions to suppress or defeat maneuver force concentrated fires into engagement areas. Survivability positions and protective obstacles must provide the necessary protection for maneuver forces to continue to successfully engage the enemy from primary or alternate positions. Effective defensive positions and mobile reserves are key components for a successful area defense.

3-74. The engineer staff enables effective defensive positions and mobile reserves through proper planning and preparation. The engineer staff must also understand the tactical-obstacle effort of subordinate units and coordinate efforts to ensure that they are mutually supporting. The engineer staff tracks preparation by monitoring subordinate unit status reports and specific progress on obstacle emplacement and survivability timelines, anticipating and resolving problems that may occur.

Retrograde

3-75. Mobility and countermobility are normally the focus of engineer support to the retrograde. The actual priority of effort depends on whether or not the unit is in contact with the enemy. The underlying purpose of engineer support to the retrograde is twofold as follows:

- The mobility of the force must be maintained, regardless of the type of retrograde being conducted. Engineer tasks that support mobility focus on maintaining the ability of the force in contact to disengage while preserving the main body freedom of movement and maneuver.
- The force is particularly vulnerable to enemy actions during the retrograde; therefore, the force must be protected. Consequently, the retrograde is normally conducted under limited-visibility conditions. Engineers support units that remain in contact, and they extend the time that is

available to the commander by reducing enemy mobility through emplacing obstacles and modifying terrain.

3-76. Engineer involvement in combined arms planning for a retrograde is essential. The level of detail developed by the engineer staff (in conjunction with the BCT staff) affects resourcing, task organization, and execution. Because of the tempo required during the operation, contingencies must be addressed, war-gamed, prioritized, and resourced before execution. The tactical situation does not normally facilitate significant changes to a plan once the operation is underway. Engineer involvement is of special importance during the IPB process. Input into the modified, combined-obstacle overlay highlights the terrain effects on the attacking enemy. Once determined, the product of the terrain analysis impacts—

- Obstacle positions.
- Required lane locations.
- Decision point positions (to cause lane closure or execution of situational and reserve obstacles).
- Counterattack plans.

3-77. The engineer staff coordinates with the S-2 on engineer-specific information requirements. The information requirements are aimed at facilitating and maximizing the efforts of engineers who support units that are conducting the counterreconnaissance fight and retrograde. Considerations include predicting enemy reconnaissance efforts on the situational template and on main-body attack routes into the area of operations. These considerations aid in planning and executing obstacle belts and groups that support the retrograde operation.

3-78. The route identification that the force uses is vital to retrogrades. Mobility must be maintained along these routes. While conducting terrain analysis during the IPB process, the engineer staff works closely with the S-2 to determine feasible routes. Once this planning is complete, the routes are coordinated with the S-3 and the commander to determine which routes are necessary to meet operational requirements. Once these routes are identified, route reconnaissance can be conducted to verify their trafficability and suitability for the force. Information gained on the reconnaissance is critical during COA development and analysis. Route selection also affects countermobility planning and execution. After the routes are finalized, engineer unit commanders ensure that the routes are upgraded and maintained as directed. LOC maintenance typically requires EAB augmentation. Lanes through friendly obstacles must be established and marked. Every Soldier in the unit must clearly understand the unit lane-marking system. Guides are frequently left at obstacle lane locations to ensure safe passage. Because of the critical nature of the mission, commanders must assume the responsibility of providing guides if mission variables allow.

3-79. A major component in countermobility planning and execution during a retrograde is the synchronization of warfighting functions. Countermobility missions can only be executed with a clear understanding of the commander's intent and concept of the operation. Situational obstacles are key combat multipliers to the commander and are normally centrally controlled.

3-80. Due to the critical requirements for mobility and countermobility, the maneuver unit may only have limited assets to use for survivability. The survivability that is provided typically focuses on supporting the protection of key assets and systems. Selected fighting positions may also be developed to support key engagement areas that support the retrograde. Existing fighting positions that support the scheme of maneuver of the withdrawal may also be used, but most survivability depends on the effective use of terrain and other measures (camouflage, concealment, deception).

3-81. The execution of lane closures is vital to the retrograde. Normally, lane closure is centrally planned and executed by the BCT to ensure that mission execution conforms to the commander's intent and the scheme of maneuver. Frequently, obstacles that are identified for closing lanes become brigade reserve obstacles. Lane closure depends on—

- Enemy and friendly activities.
- Contact levels.
- The size of the force left in contact.
- Available engineer forces.
- The time available.

3-82. Lane closure personnel (engineers if mission variables allow) close lanes upon notification from the commander to whom execution authority was delegated (the maneuver force overwatching the obstacle). Synchronization is critical to prevent the trapping of friendly forces between the obstacle and the enemy. Target turnover becomes important when reserve targets are prepared by engineers and are turned over to maneuver units for execution. Target turnover and execution must be detailed so that the receiving unit (platoon or squad leader) can execute the mission according to the brigade commander's intent. Lane closures must be rehearsed. (See ATP 3-90.8.)

3-83. If aviation augmentation is available to support the rapid repositioning of units and to attack enemy forces, engineers may need to conduct forward aviation combat engineering and obstacle emplacement. Detailed planning between aviation units and the engineer staff is critical in synchronizing this effort.

3-84. Deception targets the enemy ability to be decisive and prevents the concentration of combat power against friendly force weakness. The engineer staff coordinates with the S-2 and S-3 during initial planning to determine which battlefield deception assets are available. For example, a mobile gun system or tank silhouette that is partially dug in may cause the enemy to think that the friendly force is defending a retrograde instead of conducting one. In addition to shaping the battlefield, countermobility can also deceive the enemy as to which mission the unit is actually conducting. For example, using engineer equipment forward gives the appearance of preparing for a hasty defense while covering the withdrawal of a force. Employing decoys is part of camouflage, concealment, and deception. (See ATP 3-37.34 for additional information.)

3-85. Even though the unit is conducting a retrograde, some engineer assets and supplies may be moving forward. Other equipment may require specialized support. The engineer staff is responsible for resolving these issues. This is accomplished by coordinating with the S-3 or S-4 on the—

- Transportation support for selected engineer equipment found in EAB units that requires assistance due to slow speed. (To meet this requirement, transportation assets may have to come from higher headquarters and be pre-positioned to support this movement.)
- Movement of engineer Class V supplies and the specific locations that are required for delivery. (Some Class V supplies may need to be positioned forward to facilitate the execution of lane closure.)
- Fuel requirements of engineer equipment that affect the quantity of fuel that remains forward.

SUSTAINMENT CONSIDERATIONS DURING DEFENSIVE OPERATIONS

3-86. In contrast to the offense, the defense breaks the momentum of the enemy attack. The engineer company does not have the requisite haul assets to transport necessary Class IV and V supplies to the obstacle site. Mission-critical materials must be planned and throughput must be coordinated to bring those items to the obstacle site. Only the barrier material that is required to conduct specific engineer mission support is requested to be brought forward. Stockpiling unit sustainment supplies (rations, water, fuel) may also be required. The push-and-pull method of resupply may be used. The method used is generally dictated by the time available before enemy contact is expected. In planning for the defense, it is important to—

- Maintain a brigade level or, if possible, a division or joint task force level focus on Class IV and V obstacle material handling in the brigade area of operations. (Maneuver battalions have limited capabilities to move or transport these materials; therefore, material movement must be synchronized and coordinated with supported unit haul assets.)
- Maintain a low visibility of Class IV and V supply points. (Enemy intelligence collection assets focus on these sites during reconnaissance.)
- Resupply during limited visibility conditions when possible. (This reduces the fingerprint of the obstacle material moving on the battlefield and the potential for enemy interference.)
- Plan for lost, damaged, and destroyed obstacle material and engineer equipment.
- Maintain an emergency stockpile of Class IV and V supplies when possible.
- Develop and use preconfigured obstacle packages to push logistics to the obstacle site. (These packages facilitate obstacle planning, delivery, and execution for the brigade.)

- Plan additional protection for engineer units, equipment, and sustainment during the defense. (These assets may be a high-value target for the enemy.)
- Plan additional maintenance of engineer equipment and its rapid evacuation as required. (Fuel consumption and engineer-specific Class IX supply expenditures are high for engineer equipment.)

COMPLEX TERRAIN CONSIDERATIONS

3-87. Offensive and defensive activities may be conducted in complex terrain. Each environment presents its own challenges to planning and conducting engineer operations and may require engineers to employ specialized knowledge, skills, techniques, and equipment. The following paragraphs present characteristics of complex terrain that impact engineer operations. They are intended to be an overview of those environments as the doctrinal application of engineers is constant. (See ATP 3-34.80 for additional information about complex terrain.)

PLANNING CONSIDERATIONS

3-88. Just as in planning for other environments, identifying essential tasks for mobility, countermobility, and survivability is critical to analyzing the engineer mission in complex terrain. An overall assessment of engineer requirements will likely reveal that engineers are required in higher proportions at the lower tactical level in response to the noncontiguous and decentralized activities that are inherent within complex terrain. It will also likely be discovered that general engineering capabilities are necessary in manipulating urban terrain. General engineers will be in greater demand in complex terrain to improve or restore the infrastructure in supporting force bed-down requirements and providing the necessary hardening to protect facilities and critical infrastructure.

3-89. Engineer planners must assess the engineer capability restrictions that are imposed by the rules of engagement and the presence of noncombatants. Not all engineer systems can be used in an urban environment or on restrictive terrain (such as a subterranean condition). Depending on the threat, the noncontiguous nature of complex terrain may require the additional allocation of security forces to protect vulnerable general engineers who execute tasks outside secured areas. It may also require additional emphasis on route and area clearance missions to enable the freedom of movement.

3-90. The urban setting provides opportunities for additional resources and services that are not always available in other environments. The engineer considers the availability of HN equipment, construction materials, fortification resources, civilian workforce assets, and civilian subject matter experts. Materials and resources may also come from other sources, such as nongovernmental organizations. Engineer planners look at the availability of ammonium nitrate, acetylene, propane, lumber yards, concrete barriers, vehicles, and construction equipment that can influence friendly defensive tasks and the enemy. (See FM 3-34.170 for a discussion of engineer reconnaissance and resource assessments.)

SPECIAL CONSIDERATIONS FOR ENGINEER LEADERS

3-91. Complex terrain provides numerous opportunities and challenges for engineers. Engineer leaders at all levels must ensure that subordinates conduct proper planning procedures. Furthermore, lessons learned and tactics, techniques, and procedures shared could greatly increase the effectiveness of follow-on missions in similar, complex terrain.

ENGINEER SUPPORT TO BRIGADE COMBAT TEAM ENABLERS

3-92. Engineers provide focused support to various units within and augmenting the BCT. Much of the following discussion concerns the hardening aspects of survivability and the engineer support requirement to properly protect vital equipment and personnel. (See ATP 3-37.34.)

3-93. Another significant aspect may be engineer reconnaissance. (See FM 3-34.170.) Most often, organic engineers are focused on, and dedicated to, the tactical mission in support of maneuver units within the BCT. Many tasks are performed by augmenting engineer units, although combat engineers who are organic to the BCT may also perform them.

ARTILLERY

3-94. Most engineer missions that are conducted in support to field artillery units and assets are conducted through survivability. Artillery units often require engineer support to construct survivability positions for individual howitzers, fire direction centers, and radars. These survivability positions are built to protect Soldiers and equipment from the effects of direct and indirect fires.

3-95. Weapon-locating radars are used by artillery units to facilitate counterfire missions. These radars are valuable assets to the BCT commander and are often a high priority for protection. Most often, berms are used around radars to protect them from enemy fires. These radars are high-value targets for enemy forces and have no armor or self-protection capability. Engineer planners must consider survivability for these assets.

3-96. Planning is critical when obscuration is required. Mechanical obscuration is only available from EAB obscuration companies, which only reside in the reserve component.

AIR DEFENSE ARTILLERY

3-97. Engineer support to aerial damage assessment units and assets is focused on hardening and other survivability tasks. Aerial damage assessment assets may include radars that are used to detect incoming ballistic missiles that range from intermediate to short-range ballistic missiles; cruise missiles; unmanned-aircraft systems; rockets, artillery, and mortars; submunitions; tactical air-to-surface missiles; and fixed- and rotary-wing aircraft. These radars and firing systems may require the construction of berms to protect them from enemy action. Though the BCT does not have organic aerial damage assessment units, it can expect to be routinely augmented with aerial damage assessment capabilities. The BCT can also expect to have corps- and division-controlled aerial damage assessment assets positioned within the BCT area of operations, which may require survivability effort from the BCT task-organized engineer force.

3-98. In heavily wooded or jungle terrain, aerial damage assessment units may require engineers to clear fields of fire to facilitate missile launch or direct fire engagements by avengers. Augmenting engineer equipment and capabilities may be required to meet these tasks. When static, these weapon systems may require survivability positions that protect Soldiers and the system; however, they also allow the full use of the air defense components of the vehicle.

AVIATION

3-99. Engineer support to aviation units and assets focuses on forward aviation combat engineering tasks. These tasks can often be met by organic BCT engineers, but many general engineering tasks will require the augmenting engineers.

3-100. Organic engineers within the BCT can quickly berm temporary aviation revetments to protect aircraft from the effects of enemy fires. The emplacement of gabion barriers in support of aircraft parking areas provides proper survivability and protection to aircraft. (See ATP 3-37.34 for details on constructing aircraft revetments.)

3-101. Combat engineering supports aviation units in the construction of forward arming and refueling points. Organic engineers can provide some support, but augmenting engineers bring capabilities that are not found in organic engineer companies. Forward arming and refueling points may require survivability support most often by berming. The berming may include the aircraft and ammunition or fuel being stored nearby. Locations chosen to establish a forward arming and refueling point may require preparation (clearing and grubbing). The armored combat earthmover and deployable, universal combat earthmover can do many of these tasks, but bulldozers are better-suited for heavy vegetation. It may also be necessary for engineers to construct small trenches in which to place fuel hoses to prevent damage. Contamination control measures may be addressed as the operating tempo decreases.

3-102. Organic combat engineers can provide clearing and leveling for launch and recovery sites for the TUAS found at the BCT level and below. General engineering augmentation is required to support operational-level, unmanned-aircraft systems that are larger and require an airstrip for takeoff and landing. If paving is required, engineer planners must ensure coordination for paving and concrete augmentation.

MILITARY POLICE

3-103. Engineer support to military police units and assets within the BCT includes the potential requirement to support the construction of temporary and permanent detention facilities. These facilities may range in size based on special requirements and the tactical situation. Combat engineers can assist in the construction of temporary facilities by using concertina and other barrier materials. Temporary facilities may require sustainment and improvement, and permanent facilities may require support from augmenting engineer vertical and horizontal construction units. When a permanent facility is constructed, power generation support from prime power units may also be required.

3-104. Military police and HN police headquarters may require survivability support. Combat engineers can provide the lower-end hardening of facilities by constructing berms or emplacing gabion barriers. More permanent hardening requires augmentation by construction units.

3-105. Military police may also require support when constructing vehicle checkpoints and traffic control posts. Engineer planners coordinate with planners from the provost marshal cell for this and similar types of support. (See ATP 3-37.34.)

MILITARY INTELLIGENCE

3-106. Engineer support to MI units may include engineer reconnaissance assets and survivability support for specific intelligence sites and assets (unmanned-aircraft system launch and recovery sites). Tactical, unmanned-aircraft systems found at the BCT level and below require smaller, less advanced launch and recovery sites. Organic engineers may be required to assist detachments in clearing and preparing launch and recovery areas, including clearing vegetation and leveling sites. Larger, unmanned-aircraft systems found at the operational level of command may require extensive engineer augmentation support, such as an airstrip. (Some unmanned-aircraft systems under Air Force control actually require a paved runway.) When supporting these units in the BCT area of operations, augmentation by general engineering units is required to construct and maintain runways. If paving is necessary, engineer planners must ensure coordination for paving and concrete detachment augmentation.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR

3-107. Engineer support to CBRN units and assets may be extensive if the BCT faces a significant CBRN threat. When CBRN decontamination is required, organic engineer companies may be tasked to assist in the construction of decontamination sites. Most often, engineer support includes digging sumps and drainage ditches to control the wastewater runoff that is associated with decontamination. Engineers may also be tasked to construct combat roads and trails to improve access to the site. Engineer units coordinate with CBRN units to construct the decontamination site and ensure that site standards are met. For large-scale decontamination, general engineering units may be required to meet demands.

SIGNAL

3-108. Engineering support to signal units primarily consists of geospatial and survivability support. Terrain visualization products assist signal planners in plotting communications coverage. Survivability support is aimed at protecting critical signal sites and assets. When signal nodes impact the power consumption capacity of a location, nontactical power generation may require prime power unit support.

CIVIL AFFAIRS

3-109. Engineer support to civil affairs units and assets might be significant and may be linked to the civil affairs plan. (See FM 3-34.170 and FM 3-34.400 for an additional, in-depth discussion of infrastructure reconnaissance and its relationship to civil affairs.)

SUSTAINMENT

3-110. Engineer planners must be constantly aware of the necessary requirements of supporting sustainment. The engineer assets that typically provide this support come from EAB engineer

organizations. The following paragraphs are intended to remind engineer planners of sustainment considerations when conducting the engineer running estimate and developing orders. (See FM 3-34.400 for information on general engineering construction support that may be conducted in support of sustainment.)

Heliports

3-111. One or more landing zones or heliports may be required to support operations. When operating in austere environments, rotary-wing aircraft are used for transport, medical evacuation, and resupply. The brigade support medical company of the BSB requires a landing zone that is located close to the role 2 medical treatment facility to facilitate medical evacuation by air ambulance. Engineers can utilize geotextile materials or dust-inhibiting fluids to reduce the effects of erosion and dust.

Airfields

3-112. The BSB may position on or near airfields that are capable of landing larger, fixed-wing aircraft. Airfield maintenance and construction may be required to continue air activities from the brigade support area general engineering units that are required to accomplish tasks.

Supply Routes

3-113. The use of dedicated supply routes is critical for the sustainment of the BCT. Engineer units may be required to repair and maintain MSRs to ensure mobility for sustainment elements. The requirements for maintaining dedicated MSRs are typically very labor-intensive and require general engineering units from echelons above the BCT to execute the tasks that are associated with maintaining the MSRs. Depending on route supply conditions, it may be necessary to have multiple engineer units that support supply route maintenance and repair. Engineer planners should consider augmentation by an additional engineer battalion or brigade when supporting significant MSR requirements. Bridging support may be required to continue uninterrupted sustainment along MSRs.

Ammunition Transfer Holding Points

3-114. Ammunition transfer holding points within the BCT require berming or trenching to protect resources. Large trenches may be constructed so that ammunition can be stored and protected. These trenches and berms also mitigate the effects of blasting from a direct enemy hit.

Fuel Sites

3-115. Locations at which bulk fuel is stored must be protected. Engineers provide horizontal and vertical construction support for inland petroleum distribution systems.

Survivability

3-116. The headquarters of most units that support sustainment has limited protection and requires survivability support. Initially, organic engineer units may be able to provide limited berming and emplace gabion barriers for protection, but maneuver tasks most likely take precedence over those survivability tasks. General engineering organizations that augment the BCT are best suited to support the BSB and the BCT sustainment area. Sustainment area units may require vertical and horizontal construction support, especially as the sustainment area becomes more permanent.

POWER GENERATION

3-117. The augmentation of power generation support may be necessary, especially if the BCT is responsible for the construction or maintenance of a base camp or forward operating base. Prime power teams are uniquely designed to provide this support, particularly if the nature of the base camp or forward operating base includes multiple, colocated sustainment units. General engineering is required to facilitate and assist in the creation of a power distribution system. (See FM 3-34.400 for additional information on power distribution systems.)

PIONEERING

3-118. Combat and general engineering units have the ability to construct a variety of lifting devices and other enablers through the use of pioneering skills. This includes the construction of gin poles, shears, timber trestle bridges, three-rope bridges, ramps, and other devices that assist with lifting and loading heavy objects. These devices are especially useful in maintenance areas when forklifts and cranes may be under intensive use or where other bridging is not available or appropriate. (See TM 3-34.86 for details on constructing lifting devices and other rigging techniques.)

Chapter 4
Engineer Running Estimate

The running estimate is a logical thought process and extension of the MDMP. Required information in the engineer running estimate supports the commander's visualization and decisionmaking. The engineer staff prepares and refines the running estimate concurrently with the planning process of the supported maneuver force and maintains it continuously throughout planning, preparation, execution, and assessment. This appendix provides detailed information on how mission analysis, facts, assumptions, and variables furnish the structure for the running estimate and how the estimate supports the planning, preparation, execution, and assessment of operations. Commanders are rarely briefed on the contents of every staff section running estimate. The engineer staff only briefs the part of the estimate that applies to the situation and the issue or decision being addressed. During operations, running estimates are usually presented orally, especially during preparation and execution. Written estimates may be prepared to support contingency planning during peacetime. Even then, they are normally prepared only at higher level headquarters.

PLANNING

4-1. Before receiving a mission, the engineer staff running estimate consists of a broad assessment of the operational environment and a situational awareness of engineer capabilities. Once a mission is assigned, the estimate becomes focused on required information to assist the commander in decisionmaking.

4-2. Mission analysis (MDMP, step 2) enables commanders to refine their situational understanding of the operational environment and determine their mission. Mission variables are considered during mission analysis. (See FM 6-0 for additional information.)

4-3. From the engineer perspective, mission analysis equates to seeing the tactical problem and sharing the engineer view of the operational environment, identifying engineer requirements, and determining which engineer capabilities are required to solve the problem. Once the problem is identified, the objectives during COA development and implementation are to—

- Balance requirements with capabilities.
- Integrate engineer capabilities into the concept of operation.

4-4. The running estimate parallels the MDMP. Mission analysis, facts, assumptions, and variables (METT-TC) furnish the structure for the running estimate. The engineer running estimate is initiated by—

- Analyzing the higher headquarters order.
- Conducting IPB.
- Identifying specified, implied, and essential engineer tasks.
- Identifying operational risks and mitigation methods.

ANALYZE THE HIGHER HEADQUARTERS ORDER

4-5. The engineer staff thoroughly analyzes the higher headquarters order by initially focusing on the engineer annex, which conveys the overall maneuver unit mission, commander's intent, and concept of the operation (two levels up). Analysis includes understanding the—

- Current situation (enemy and friendly).
- Engineer mission, intent, and scheme of engineer operations (two levels up).

- Assigned area of operations (normally prescribed by boundary lines).
- Estimated time available.
- Adjacent unit missions and their relation to the higher headquarters plan.
- Engineer contributions (by task and purpose) to the mission, commander's intent, and concept of operation (two levels up).
- Available assets.

CONDUCT INTELLIGENCE PREPARATION OF THE BATTLEFIELD

4-6. IPB is an integrating process that is critical to the success of planning. IPB is a systematic, continuous process of analyzing the threat and environment, including terrain, weather, and civil considerations. The IPB centers on creating a maneuver template of the enemy, anticipating enemy capabilities, and predicting enemy intentions based on threat doctrine standards and the order of battle. Defining the operational environment identifies the characteristics of the environment that influence friendly and threat activities. The engineer must understand the S-2 threat and situational template to analyze enemy engineer capabilities. Engineer reconnaissance may be required to support IPB, and the engineer staff must be proactive in recognizing these requirements and in tasking the appropriate engineer elements. The four steps of the IPB are as follows:

- **Step 1.** Define the operational environment.
- **Step 2.** Describe environmental effects.
- **Step 3.** Evaluate the threat.
- **Step 4.** Develop possible enemy COAs.

4-7. IPB is conducted by the entire staff, with each staff member providing input based on their area of expertise and focus. The engineer staff focuses on the required terrain, weather, civil consideration analysis, and enemy missions and tasks to be conducted that may hinder the maneuver commander's ability to execute mobility, countermobility, and survivability.

Terrain, Weather, and Civil Consideration Analysis

4-8. The engineer staff analyzes the terrain, weather, and civil considerations and assesses their impacts on military and engineer operations. As the terrain visualization experts, the engineer staff coordinates for geospatial products from the geospatial engineering team to enhance the commander's visualization of the terrain and enable decisionmaking. The object of terrain analysis is to determine the impact that the terrain and weather have on mission accomplishment. Engineers support the S-2 in this process. For tactical missions, the five military aspects of terrain (observation and fields of fire, avenues of approach, key terrain, obstacles, and cover and concealment) are used to analyze the terrain. (See FM 6-0 for a detailed discussion of the five military aspects of terrain.)

4-9. Existing and reinforcing obstacles are analyzed during the IPB and running estimate processes, but the focus is on existing obstacles. Obstacles define avenues of approach; create cross-compartments in avenues of approach; and can turn, fix, block, or disrupt a maneuver. Some examples of existing obstacles are—

- Swamps.
- Dense forests.
- Deep, steep-sloped ravines.
- Rivers.
- Streams.
- Hills or mountains with excessive slopes.
- Cultural obstacles.
- Urban areas.
- Quarries.
- Railroad beds.

- Built-up or elevated roads.
- Potential explosive hazards (gas storage sites).

4-10. Reinforcing obstacles are those that are constructed, emplaced, or detonated to enhance existing obstacles or terrain. There are two types of reinforcing obstacles: tactical and protective. Both types include area and point obstacles. Some examples of reinforcing obstacles include—

- Minefields.
- Tank ditches.
- Abatis.
- Tank walls.
- Road craters.
- Wire entanglements.

4-11. A weather analysis determines the effect of weather on the mission. (See table 4-1.) Snow, dust, humidity, and temperature extremes have an impact on Soldier efficiency and limit the effectiveness of weapons and equipment. Poor visibility affects the integration of obstacle emplacement with survivability positions in engagement area development. Inclement weather usually favors an attacker because defenders are less alert; however, it also degrades mobility and mission command and weapons are less effective. The attacker can close with the defender more easily in limited visibility conditions.

Table 4-1. Weather effects

Weather Condition	*Area/Element Affected*
Temperature	Soldiers, weapons, equipment, and civil disorder
Humidity	Soldiers and equipment
Precipitation	Soldiers, trafficability, and equipment
Visibility	Observation and integration of obstacles and survivability
Light data	Observation and survivability construction rate
High winds (greater than 35 knots [40 miles per hour])	Damaged materiel and structures, reduced visibility (blowing sand, dust, and battlefield debris), impaired vehicle movement, improved traffic ability (causing soil to dry faster), and temperatures below 40°F (4°C) (makes wind chill a critical consideration)
Cloud cover	Friendly close air support (2,500-foot [762-meter] ceiling), threat close air support (300-foot [91-meter] ceiling), visibility, obscurant or CBRN hazard employment, and temperature
Legend: CBRN chemical, biological, radiological, and nuclear	

4-12. *Civil considerations* are the influence of manmade infrastructure, civilian institutions, and activities of the civilian leaders, populations, and organizations within an area of operations on the conduct of military operations (ADRP 5-0). The engineer staff analyzes the effects of civil considerations to understand the population (demographics and culture), government, economics, nongovernmental organizations, history, and other factors. This analysis influences the selection of objectives, movement of forces, and positioning of units for current operations and future plans. Civil considerations include areas, structures, capabilities, organizations, people, and events. (See FM 6-0 for more information.)

Enemy Mission and Mobility, Countermobility, and Survivability Capabilities

4-13. Threat evaluation and integration are key components of the IPB. Enemy mission and mobility, countermobility, and survivability capabilities are subcomponents of the threat evaluation and integration process. The engineer staff supports the S-2 during the threat evaluation by focusing on enemy engineer capability as it relates to the enemy mission. When executing this component of the running estimate, the engineer staff must first understand the anticipated enemy mission (attack or defend) and consider how enemy engineers are doctrinally employed. The engineer staff then develops an estimate of enemy engineer capabilities. To do this, the engineer staff uses the S-2 order of battle and a knowledge of enemy engineer

forces and other assets (combat vehicle reconnaissance efforts or self-entrenching capabilities) that may impact engineer operations. The engineer staff must also consider intelligence pertaining to recent enemy engineer activities or tactics, techniques, and procedures.

4-14. The engineer staff uses the S-2 situational template and enemy capability estimate to plot the enemy engineer effort (obstacle or survivability effort) and its probable location. Coordinating with the S-2, the engineer staff recommends information requirements that confirm or deny enemy engineer capability in the situational template. A summary of the enemy mission and mobility, countermobility, and survivability capabilities are as follows:

- Anticipate enemy engineer operations and their impact on the battle.
- Assess threat patterns and capabilities.
- Consider the enemy mission and doctrinal employment of engineers.
- Estimate enemy engineer capabilities based on the—
  - S-2 order of battle.
  - Threat engineer organizations.
  - Personnel and equipment capabilities.
  - Recent activity or newly developed tactics, techniques, and procedures.

4-15. Based on the S-2 situational template, enemy patterns, and enemy engineer doctrine tactics, techniques, and procedures, the engineer staff plots enemy—

- Mobility assets and their relative locations within enemy formations.
- Mine capabilities, mine systems (tactical and protective), and firing ranges of artillery-delivered scatterable mines.
- Engineer reconnaissance assets based on doctrine organization within enemy maneuver units.
- Recommended, engineer-specific, high-value targets (bridging assets, breaching assets, scatterable mine delivery systems).

ANALYZE THE ENGINEER MISSION

4-16. Analyze the engineer mission by—

- Identifying specified and implied mobility, countermobility, and survivability and general engineering tasks.
- Analyzing friendly mission and mobility, countermobility, and survivability capabilities.
- Determining constraints.
- Determining the risk level as applied to engineer capabilities.
- Conducting time analysis.
- Developing essential tasks for mobility, countermobility, and survivability.

Identify Specified and Implied Tasks

4-17. The engineer staff identifies specified and implied tasks for mobility, countermobility, and survivability.

4-18. Specified tasks are specifically assigned to a unit by higher headquarters. They may be found in the base order, annexes, and overlays. For engineers, this could include—

- Obstacle zones.
- Obstacle belts with intents.
- Required numbers of breach lanes.
- Breach types designated by the higher commander.

4-19. Implied tasks must be performed to accomplish a specific task or the mission, but they are not stated in the higher headquarters order. For engineers, this could include—

- Obstacle handover coordination during a relief-in-place mission.
- EOD explosive hazards neutralization assistance.
- Gap-crossing support if crossing a river is necessary to accomplish the mission.

Analyze the Friendly Mission and Capabilities

4-20. The engineer staff must understand the friendly mission, commander's intent, and operational concept and how engineer capabilities contribute to the mission. To estimate the friendly mission and mobility, countermobility, and survivability capabilities, the engineer staff must—

- Consider the friendly mission.
- Evaluate friendly engineer capabilities and their impact on accomplishing the mission.
- Estimate available engineer assets based on the task organization of—
  - Maneuver forces.
  - Engineer forces.
  - Higher engineer headquarters.
  - Adjacent engineer units.
  - Attachments and detachments.
  - HN or contractor capabilities.
- Consider the availability of critical resources.

4-21. The engineer staff considers assets that can provide engineer capability. These considerations include—

- Task-organized engineer units.
- Nonengineer units (mine plows).
- Units under the control of higher engineer headquarters (HN and contracted civilian support).
- Adjacent units.

4-22. This understanding facilitates requests for additional resources based on the shortfalls that are identified during mission analysis and COA development.

4-23. Having determined the assets available, the engineer staff works with the S-3 to determine the estimated time available. The engineer staff can apply standard planning factors or known unit work rates to determine the total engineer capability. For example, in the offense, the engineer staff identifies the supported element size and scheme of maneuver to determine the number of lanes required to pass the point of penetration. This requirement is compared to the available capability; and if needed, the staff can request augmentation. In the defense, the ABE determines the number of obstacles (or linear effort in kilometers), and protective positions that engineers could construct with available resources. In stability, the focus may be on the number of clearing teams that can be created. During COA development, the engineer staff uses the capability estimates that are unit-specific based on assigned and attached capabilities.

4-24. The engineer staff combines the terrain and weather analysis, the enemy and friendly mission analysis, and mobility, countermobility, and survivability capabilities to form facts and assumptions about the—

- Likely enemy engineer effort.
- Most probable enemy COA.
- Potential enemy vulnerabilities.
- Critical friendly requirements.
- Impact of the preceding factors on the mission.

Determine Constraints

4-25. Constraints are restrictions that are placed on a unit by higher headquarters. They dictate an action or inaction, restricting the freedom of action that a subordinate commander has for planning. Constraints can

take the form of a requirement to do something. For engineers, this could include designated reserve targets, obstacle belts (with intents), and lane requirements. Constraints can also prohibit action, such as the stated approval authority for the use of scatterable mines. Obstacle zones and belts are also examples of constraints because they limit the area in which tactical obstacles can be placed.

Determine Risk Level

4-26. Risk (tactical) consideration begins during planning as commanders designate and weigh the decisive action. A commander should mitigate (and may specify) an acceptable level of risk to accomplish the mission. For instance, the priority obstacle effort in a defense may be employed on the most likely enemy avenues of approach while situational obstacles are to be planned on the most dangerous avenues of approach as an economy-of-force measure. The engineer staff must understand how a risk involving an engineer capability specifically impacts combined arms activities and must advise the commander accordingly. One such risk, such as the decision to employ or not employ engineer reconnaissance teams to support the information collection process, may be mitigated by employing other reconnaissance assets. (See ADRP 6-0, FM 3-90-1, and FM 3-90-2 for additional information on tactical risk.)

Perform Time Analysis

4-27. The engineer staff must ensure that engineer operations are included in the combined arms time analysis. The first step of a time analysis is to determine the actual time available. The engineer staff establishes an assumption of the time available while preparing the friendly capabilities portion of the running estimate and then refines the time analysis. This technique assists the engineer staff in accurately refining the estimate of time available and adjusting the friendly engineer capability accordingly. A good tool to use in this process is a basic timeline sketch that includes the—

- Supported unit OPORD.
- Engineer unit OPORD.
- Movement times.
- Line-of-departure or prepare-to-defend times.
- Rehearsals.
- Hours of darkness or limited visibility.

Develop Essential Tasks for Mobility, Countermobility, and Survivability

4-28. An essential task for mobility, countermobility, and survivability is a specified or implied mobility, countermobility, and survivability task that is critical to combined arms mission success. Essential tasks are identified from specified and implied tasks. These tasks, combined with the maneuver commander's guidance, enable the engineer staff and other staff representatives to recommend essential tasks for mobility, countermobility, and survivability to the maneuver commander during the mission analysis brief. At the conclusion of the mission analysis brief, the commander approves the essential tasks for mobility, countermobility, and survivability that are considered relevant.

CONDUCT RISK ASSESSMENT

4-29. Risk management is an integrating process and occurs during all activities. *Risk management* is the process of identifying, assessing, and controlling risks arising from operational factors and making decisions that balance risk cost with mission benefits (JP 3-0). Risk management involves the following steps:

- **Step 1.** Identify hazards.
- **Step 2.** Assess hazards to determine risk.
- **Step 3.** Develop controls and make risk decisions.
- **Step 4.** Implement controls.
- **Step 5.** Supervise subordinates and evaluate activities.

Note. Step 3 is accomplished during COA development, analysis, comparison, and approval. During step 4, controls are implemented through mission orders, mission briefings, running estimates, and SOPs. Step 5 is conducted continuously throughout the operation.

4-30. Commanders integrate risk management into the MDMP and troop leading procedures. During mission analysis, the focus is on performing the first two steps, which are assessment steps. Hazards are identified by using METT-TC as a standard format. Hazards can be associated with enemy activities, accident possibilities, weather or environmental conditions, health conditions, sanitation conditions, behavior, and/or materiel or equipment. Hazards are assessed, and risk is assigned in terms of probability and severity. (See ATP 5-19 for detailed information on risk management.)

PREPARATION AND EXECUTION

4-31. Maintaining the running estimate is a command post function that directly contributes to assessing and directing ongoing operations and planning future operations. The construct of the running estimate also provides a framework for organizing and arranging information displays with the command post or cell.

4-32. During preparation and execution, staffs analyze the situation within their fields of interest in terms of mission variables to maintain running estimates. Maintaining a running estimate helps staff make recommendations (within their areas of expertise) to support the commander's decisionmaking. Staffs also use the running estimate to offer recommendations (for information and assistance only) to other staff elements and subordinate commanders. Staff recommendations may be in writing, but they are usually presented orally during preparation and execution. Presentations may be formal or informal and in the form of briefings, written estimates, or staff studies.

4-33. During preparation and execution, the engineer running estimate is updated based on new information which answers information requirements that are established during planning. Information requirements include information elements that the commander and staff need to address mission variables and successfully conduct operations. Table 4-2 shows the mission variables of METT-TC and some of the associated information requirements for each factor.

Table 4-2. METT-TC information requirements

Mission Variable	*Information Requirements*
Mission	Status of engineer missions (focused on essential tasks for M/CM/S) • Planned • Prepared
Enemy	Enemy disposition • Organization • Strength • Location Obstacle information • ISR results • Engineer reconnaissance • Mine strikes Enemy capabilities (new tactics, techniques, and procedures) Enemy vulnerabilities Probable enemy COAs
Terrain and weather	Updated terrain information to reflect the effects of combat Environmental considerations

Table 4-2. METT-TC information requirements (continued)

Mission Variable	*Information Requirements*
Troops and support available	Current task organization Engineer combat power Unit readiness (normally two levels down) Personnel strength (critical military occupational specialty, maintenance status, and supply status) M/CM/S capabilities Supplies and support available Joint, multinational, and interagency forces DOD or Department of State civilians Contractors
Time available	Information related to how much time is available to plan, prepare, and execute operations
Civil considerations	Influences and immediate impacts on engineer operations in the AO Areas (district boundaries, economic centers, religious or tribal enclaves) Structures (bridges, dams, power plants, cultural sites) Capabilities (status of essential services, HN resources, and services that can support military operations) Organizations (nonmilitary groups or institutions that can influence the population) People (attitudes and activities of civil leaders and populations) Events (holidays, elections, natural or man-made disasters)
Legend:	
AO	area of operations
COA	course of action
DOD	Department of Defense
HN	host nation
ISR	intelligence, surveillance, and reconnaissance
M/CM/S	mobility, countermobility, and survivability

4-34. During preparation, running estimates continue to track the resource status. The priority for assessment is on answering the priority intelligence requirements, the friendly force information requirements, priority civil information requirements and, most importantly, the commander's critical information requirements that fall within the engineer area of expertise.

4-35. During execution, running estimates focus on identifying variances, assessing mission executions and their effects on achieving the end state, and recommending corrective actions to keep operations within the commander's intent. Assessments also address the supportability of sequels and future operations.

Chapter 5

Stability and Defense Support of Civil Authorities

Unified land operations include stability as a part of joint campaigns and DSCA as a part of homeland security. Due to events across the globe and recent major disasters within the United States, stability and DSCA have become increasingly important and are now an acknowledged part of unified land operations. The engineer staff and engineer company commander must have a fundamental understanding of the missions and special engineer requirements that are associated with stability and DSCA. The planning effort for both operations requires the same degree of planning for offensive and defensive operations. The same fundamental processes and procedures discussed in previous chapters for planning, integrating, and controlling engineer operations in support of combat apply to stability and/or DSCA. This chapter provides an overview of stability and DSCA and some of the associated engineer tasks and special considerations for each.

STABILITY

5-1. In stability, most engineer efforts are focused on theater infrastructure repair and restoration to reconstruct or establish services that support the population. Given the nature of stability, the risks that are associated with environmental hazards may have greater importance and impact in stability than in the offense or defense. Stability operations tend to last longer than offensive, defensive, and DSCA operations. Specific legal limits on BCT and engineer activities may exist based on security agreements, treaties, and agreements between the Department of State, U.S. Agency for International Development, and Department of Defense (DOD). Legal limitations will be advised with the rules of engagement.

5-2. Within the BCT, the missions that are performed by organic and augmenting engineer forces in stability are linked directly to the BCT mission and responsibility. While combat engineer route clearance and other close support capabilities may be critical tasks that are applied through the movement and maneuver warfighting function, a larger portion of engineer requirements within the BCT area of operations are likely met with general engineering and other specialized engineer capabilities. The BCT engineer staff must be prepared to coordinate the simultaneous execution of these engineer capabilities throughout the depth of the BCT area of operations and in synchronization with the warfighting functions. When the required engineer augmentation is unavailable to the BCT, the engineer staff must rely on contracted engineering support, reachback, or collaborative planning with another engineer element for the necessary technical support to enhance BCT organic engineer capabilities.

5-3. In analyzing engineer requirements in stability and determining BCT essential tasks for mobility, countermobility, and survivability, the engineer staff considers the—

- Terrain in the area of operations.
- Type of obstacles in the area of operations.
- Engineer assets and available capabilities.
- Mission duration.
- Water supply, quality, and location.
- Waste management facilities.
- Local power facilities.
- Firefighting capability.
- Cultural habits that impact engineer missions (how people travel, how they transport materials, if they fertilize crops with ammonium nitrate).

- Base camp support requirements.
- Humanitarian demining issues.
- Basic country infrastructure (road, bridge, rail, airfield, port capability) and contracted engineering support.

5-4. Stability typically falls into ten broad types that are neither discrete nor mutually exclusive. For example, a force engaged in peace operations may also find itself conducting arms control or a show of force to set the conditions for achieving an end state. This section provides an introductory discussion of the types of stability. (See ADRP 3-0 and ADRP 3-07 for more detailed information.)

5-5. The ten types of stability are—

- Peace operations.
- Foreign internal defense.
- Security assistance.
- Humanitarian and civic assistance.
- Insurgency support.
- Counterdrug support.
- Antiterrorism/counterterrorism.
- Noncombatant evacuation.
- Arms control.
- Show of force.

PEACE OPERATIONS

5-6. Peace operations are the broadest type of stability. They support strategic and policy objectives and the diplomatic activities that implement them. Peace operations are performed unilaterally or as part of a United Nations, North Atlantic Treaty Organization, or multinational force. Army forces conduct the following peace operations:

- Peacekeeping.
- Peace building.
- Peacemaking.
- Peace enforcement.
- Conflict prevention.

Peacekeeping

5-7. During peacekeeping, organic and augmenting engineer forces may be used for many missions. Engineers participate as part of a combined arms force that conducts combat engineering tasks. They may also conduct a broad range of general engineering tasks. High-frequency engineer missions that are related to peacekeeping may include—

- Constructing command posts, bunkers, and observation posts.
- Constructing protective structures (earth revetments, wire obstacles, defensive positions).
- Clearing fields of observation.
- Demolishing fortifications.
- Establishing a mine action center or explosive hazards coordination cell.
- Clearing or marking minefields.
- Maintaining minefield fences.
- Clearing mines and booby traps (but not demining).
- Providing backup support for identifying, marking, removing, and destroying explosive ordnance.
- Constructing and maintaining roads.
- Emplacing bridges.

- Repairing or upgrading airfields and landing zones.
- Constructing and maintaining detention and dislocated civilian facilities.
- Providing base camp construction and power generation.
- Providing emergency restoration of critical public services and facilities.
- Providing infrastructure reconnaissance, technical assistance, and damage assessment.
- Providing temporary bridge construction.

5-8. The removal of mines by engineers during peacekeeping is only authorized to clear operational areas. Humanitarian mine action organizations provide the preponderance of mine clearance, but it is ultimately an HN responsibility. U.S. Army participation in humanitarian mine action focuses on training HN personnel to conduct humanitarian mine action (demining training, the establishment of national mine action centers, mine risk education). U.S. military personnel may assist and train others in demining techniques and procedures; but they are prohibited by federal statute from detecting, lifting, or destroying land mines except for the concurrent purpose of supporting a U.S. military operation. Humanitarian mine action training missions are normally conducted by SOF and are assisted by EOD. SOF and EOD serve as primary trainers for demining and UXO clearance. Civil affairs personnel help establish national mine action centers, and MISO personnel provide mine risk education. Civil affairs teams, MISO teams, and other specialists are further trained to execute humanitarian mine action programs. (See Section 407, Title 10, United States Code [10 USC 407] for additional information.)

Peace Building

5-9. Typical peace-building activities include restoring civil authority, rebuilding physical infrastructures, providing structures and training for schools and hospitals, and helping to reestablish commerce. Peace building provides the reconstruction and societal rehabilitation in the aftermath of conflict that offers hope to the HN population. When executing peace-building activities, BCT efforts should complement those of nonmilitary agencies and local governments. (See FM 3-07 and JP 3-07.3 for additional information on support to peace building.)

Peacemaking

5-10. Peacemaking is primarily a diplomatic process that is aimed at establishing a cease-fire or an otherwise peaceful settlement of a conflict. The BCT may support peacemaking by performing military-to-military relations, exercises, peacetime deployments, and security assistance measures. (See FM 3-07 and JP 3-07.3 for additional information on peacemaking support.)

Peace Enforcement

5-11. Engineer support to the BCT in peace enforcement includes the engineer missions that were previously mentioned for peacekeeping; however, in peace enforcement, there is an increased likelihood of close combat and resulting combat engineering tasks. Engineers may also participate in disarming (seizing ammunition, collecting and destroying weapons and supplies, closing weapon and ammunition factories, and preventing resupply).

Conflict Prevention

5-12. Conflict prevention is primarily diplomatic actions that are taken in advance of a crisis to prevent or limit violence, deter parties, and reach an agreement short of conflict. Military activities are tailored to meet political demands and may require deploying forces to contain a dispute or prevent it from escalating into hostilities. (See JP 3-07.3 for more information on conflict prevention.)

FOREIGN INTERNAL DEFENSE

5-13. Foreign internal defense is a program that supports the friendly nations that are operating in, or are threatened with, potential hostilities. Foreign internal defense can include direct or indirect support and combat. Direct support provides direct assistance to the HN civilian or military population (civil affairs, intelligence and communications sharing, logistics). Indirect support emphasizes the principles of HN

self-sufficiency and builds strong national infrastructures through economic and military capabilities. Security assistance programs, multinational exercises, and exchange programs are examples of indirect support. Combat operations include offensive and defensive activities that are conducted by U.S. forces to support an HN fight against insurgents or terrorists. BCT forces conduct foreign internal defense according to FM 3-07 and JP 3-22.

SECURITY ASSISTANCE

5-14. During security assistance, the United States provides defense articles, military training, and other defense-related services to eligible foreign governments or international organizations via grants, loans, credits, or cash sales to further U.S. national policies and objectives. These programs include foreign military sales and international military education and training. Security assistance is a group of programs, not a mission that is assigned specifically to Army units. However, Army units and Soldiers participate in security assistance programs through peacetime engagement activities and by training, advising, and assisting allied and friendly armed forces.

HUMANITARIAN AND CIVIC ASSISTANCE

5-15. Humanitarian and civic assistance provide support to the local population, with military operations and exercises conducted predominantly by U.S. forces. Such assistance must fulfill unit training requirements that incidentally create a humanitarian benefit to the local population. The assistance that engineers may provide under humanitarian and civic assistance is limited to the—

- Construction of rudimentary surface transportation systems.
- Well drilling and construction of basic sanitation facilities.
- Rudimentary construction and repair of public facilities.

5-16. U.S. forces (including engineer headquarters) may be tasked to provide the support that is necessary to plan and execute the ground portion of humanitarian assistance. Engineers may also be tasked to provide the logistics support that is necessary to relieve human suffering or to provide forces to secure an area and allow humanitarian relief efforts of other agencies to proceed. Due to the limited capability of engineers who are organic to the BCT, engineer augmentation is required to provide even rudimentary assistance (constructing and repairing surface transportation systems, sanitation facilities, public facilities, utilities). Engineer assistance may also include the construction of feeding centers and the disposal of trash and medical, sanitary, and hazardous waste.

INSURGENCY SUPPORT

5-17. On order from the Secretary of Defense, Army forces support insurgencies that oppose regimes which threaten U.S. interests or regional stability. Although an Army force can be tasked to support an insurgency, SOF usually receive these missions. Engineer support to insurgency forces is generally limited to providing geospatial products and constructing SOF operating bases that are located outside the area of operations.

5-18. In a counterinsurgency, organic and augmenting engineer support to the BCT are similar to support for humanitarian and civic assistance and may include—

- Water supply and sanitation improvement.
- Road, airfield, and port construction.
- Multinational training.

Note. See FM 3-24 for more information on counterinsurgency.

COUNTERDRUG SUPPORT

5-19. Whether operating in the United States or in an HN, Army forces do not engage in direct action during counterdrug support efforts. Units that support counterdrug missions must be fully aware of legal limitations

regarding the acquisition of information about civilians (U.S. and foreign). Typical support to counterdrug missions includes—

- Detection and monitoring.
- HN support.
- Information systems.
- Intelligence, planning, sustainment, training, and selected mobility, countermobility, and survivability tasks.

COMBAT TERRORISM

5-20. Combating terrorism involves opposing terrorist actions. These actions include defensive (antiterrorism) and offensive (counterterrorism) components.

Antiterrorism

5-21. Antiterrorism measures are primarily aimed at reducing the vulnerability of personnel, equipment, and facilities. Antiterrorism is always a mission consideration and a component of protection. Engineer leaders develop protection measures when they conduct engineer missions. Typical antiterrorism actions include—

- Coordination with local law enforcement/HN military forces.
- Hardening of facilities, such as forward operating bases.
- Physical security actions designed to prevent unauthorized access or approach to facilities (checkpoints and roadblocks).
- Crime prevention and physical security actions that prevent the theft of weapons, munitions, identification cards, and other materials.
- Policies regarding travel activities, convoy sizes, breaks in routines, HN interactions, and off-duty restrictions.
- Protection from weapons of mass destruction (dispersion).

Counterterrorism

5-22. Counterterrorism measures are taken to prevent, deter, and respond to terrorism. Counterterrorism actions include strikes and raids against terrorist organizations and facilities. Although counterterrorism is a specified mission for selected SOF, BCTs may also contribute. When employed in this role, BCTs conduct offensive activities.

NONCOMBATANT EVACUATION

5-23. Engineers who support noncombatant evacuation operations typically operate as part of a joint force and may conduct a wide variety of tasks, such as—

- Constructing temporary facilities and protective structures inside or outside the country for U.S. forces or evacuees.
- Providing needed geospatial products and data for the operation.
- Conducting route reconnaissance and mobility for land evacuation.
- Repairing airfields and clearing helicopter landing zones for use in air evacuation.

ARMS CONTROL

5-24. In arms control, specific BCT capabilities (engineers and augmenting EOD personnel) are particularly suited to these operations. Engineers can provide geospatial products to help verify treaty compliance and construct logistics support facilities.

5-25. Maneuver companies, including the supporting combat engineer unit in the BCT, conduct checkpoints and patrols and assist in controlling, seizing, and destroying weapons. Arms control assists in protection and increases security for the local population.

SHOW OF FORCE

5-26. Engineer support to demonstrations and shows of force is normally a joint and multinational effort. Engineer tasks are very similar to those described in peace operations.

ENGINEER SUPPORT TO DEFENSE SUPPORT OF CIVIL AUTHORITIES

5-27. The overall purpose of DSCA is to meet the immediate needs of U.S. citizens in times of emergency until civil authorities can accomplish these tasks without assistance. DSCA is similar to stability, but DSCA is conducted within the United States and its territories and is executed under U.S. law. For example, National Guard forces (32 USC) under state control have law enforcement authority when operating within the United States. This authority is not granted to Regular Army forces (10 USC). Military units in a 10 USC status are under federal command and control and are usually under the operational control of the U.S. Northern Command or U.S. Pacific Command. Upon arrival, units are under the tactical control of the joint task force or joint force commander. Once deployed, units receive mission assignments from the joint task force commander or joint force commander. In addition to legal differences, operations conducted within the United States are conducted in support of other governmental agencies.

5-28. The BCT can be deployed into an area in support of civilian agencies to provide essential services, assets, or specialized resources to help civil authorities deal with situations beyond their capabilities. In civil support, the adversary is often disease, hunger, or disaster consequences. Companies and battalions, including engineer units from the BCT, can expect to participate in DSCA with or without other units from time to time.

5-29. General engineer support for the restoration of essential services is the primary focus in DSCA; however, all three engineer functions may be applied simultaneously to some degree. This is normally executed under *Emergency Support Function 3–Public Works and Engineering Annex* in support of the Federal Emergency Management Agency under the National Response Framework. USACE capabilities are employed for DSCA through traditional Army command structure, USC, public law, or DOD directive.

5-30. The BEB can provide manpower and limited support for maintaining or restoring essential services and activities to mitigate the damage, loss, hardship, and suffering that result from natural or man-made disasters. The organic geospatial engineering team within the BCT can support relief by providing geospatial products and an analysis of potential life support areas. Support to the defense CBRN response force is a major operation and has the most extensive support requirements for military personnel of the DSCA missions. Other U.S. government agencies have the primacy of responsibility for responding to domestic terrorist incidents; however, Army forces have a key supporting role and can quickly respond when federally directed by the U.S. Northern Command.

5-31. As with stability, most BCT engineer requirements in DSCA are met with augmented general engineering and other specialized engineer capabilities. The BCT engineer staff must be prepared to direct and coordinate the simultaneous application of engineer capabilities in support of the BCT mission. When the required engineer augmentation or capability is unavailable to the BCT, the engineer staff must rely on reachback or collaborative planning with other engineer elements for the necessary technical support to enhance BCT organic engineer capabilities. If the BCT is committed in response to a disaster or terrorist attack, organic and augmenting engineer forces may perform or support some critical relief and recovery functions, such as —

- Search and rescue.
- Emergency flood control.
- Hazard identification.
- Food distribution.
- Water production, purification, and distribution.

- Temporary shelter.
- Transportation.
- Firefighting.
- Medical support.
- Veterinary support.
- Communication.
- Contamination control.
- Sanitation/waste management.

5-32. In support of civil law enforcement, typical engineer tasks might include—

- Constructing or repairing law enforcement target ranges; helipads; and fuel storage, billet, command post, and maintenance facilities.
- Producing geospatial products.
- Constructing and upgrading access roads for drug interdiction patrols.
- Clearing observation fields for counterdrug teams.
- Providing explosive breach capabilities or training to law enforcement personnel.
- Integrating engineer operations into stability and DSCA.

5-33. In DSCA, there may be a need for specialized engineer requirements (prime power, well drilling, firefighting). Engineer planners must have a general understanding of the capability of specialized assets within the engineer force structure and an ability to determine when the employment of those assets would be appropriate.

5-34. The engineer staff and the engineer commander may have a requirement to integrate the activities of several engineer capabilities (assessments, engineering services, emergency repairs) within the BCT area of operations. During a major reconstruction effort, additional engineer battalions (and possibly an engineer brigade) could be task-organized to the BCT. These units are equipped and manned to fulfill the design, construction management, and command requirements that are needed to accomplish missions and will likely include—

- Base camp construction and power generation.
- Emergency critical infrastructure restoration.
- Infrastructure reconnaissance, technical assistance, and damage assessment.
- Emergency demolition.
- Debris removal.
- Route opening.
- Road and trail construction and repair.
- Paved, asphalt, and concrete runway and airfield repair.
- Assets that prevent foreign object damage to rotary-wing aircraft.
- Temporary bridge construction.
- Area damage control missions that support the mobility of unified action partners.
- Regional access through the construction and upgrade of ports; airfields; and reception, staging, onward movement, and integration facilities.

INTEGRATION THROUGH WARFIGHTING FUNCTIONS

5-35. The following are considerations for using warfighting functions to integrate engineer support into stability and DSCA operations.

Mission Command

5-36. Conducting effective interagency coordination and ensuring a unity of effort may require the establishment of working groups, boards, and coordination centers and the use of LNOs at various levels. (See FM 3-07 for additional information on interagency coordination). Engineer planners must consider the

span of control in arraying engineer units. No single command option works best for all stability and DSCA efforts. Additionally, an Army force will be a supporting organization rather than the lead agency.

Movement and Maneuver

5-37. In stability, engineers support BCT movement and maneuver as they do in offense and defense. However, there is likely to be more emphasis placed on minimizing the effects of breaching or clearing on infrastructure and of collateral damage to civilian areas. In stability, improving mobility in the BCT area of operations may be part of the unit mission. If so, the BCT may be augmented with U.S. military and civilian engineers, contractors, and HN engineers. This includes the tasks that are performed by elements other than engineers (military police, CBRN, EOD). Depending on the magnitude of the required effort, the BCT may elect to establish an integration cell (assured mobility section) to coordinate associated activities.

5-38. Engineers must be creative in implementing nonlethal obstacles (fences, roadblocks, checkpoints) to control civilians or to separate belligerent forces while working within the limitations of the rules of engagement or use-of-force directives.

5-39. Movement and maneuver missions for engineers during DSCA include combat and general engineering efforts to clear roads, repair roads and, in some cases, repair bridges. The organic engineering equipment is well suited for the removal of rubble and debris associated with disasters.

Intelligence

5-40. In stability, the engineer planner must expand beyond geographical and threat force capability considerations to understand ethnic and religious factions, infrastructure and key structure assessments, and current capabilities of existing facilities that provide essential services. In DSCA, the adversary is often disease, hunger, or natural or man-made disaster consequences.

5-41. Stability operations place additional emphasis on understanding the civil considerations (political, cultural, historical, economic, ethnic, humanitarian) that are in an area of operations. For instance, cultural information might be important in predicting the potential reactions of individuals in the civilian area of an operation. Determining the disposition of the civilian population and how they may react (hostile or neutral) to construction projects may help engineer planners determine where best to apply engineer manpower and resources to be most effective. Engineer planners must seek all available sources for information (engineer reconnaissance and infrastructure assessments, USACE field force engineering units, nongovernmental organizations that were in the area before U.S. forces arrived).

Fires

5-42. Fire support planning for stability is the same as for offensive and defensive activities though there could be limitations and restrictions on the use of certain indirect fire assets. Engineers provide specialized geospatial products to highlight critical areas, structures, and infrastructures (including underground utilities such as oil pipelines) where there is an increased potential for collateral damage and subsequent effects on follow-on repair and reconstruction efforts.

Sustainment

5-43. In stability, the support provided by sustainment units often extends beyond sustaining military operations and may become a crucial shaping task or decisive action. Engineers may be a critical enabler in the provision of essential services until the HN government or other agencies can do so. Engineering tasks primarily focus on assisting the stabilization of a region by reconstructing or establishing infrastructure to provide essential services to the population and by supporting the sustainment of maneuver forces in their missions. Infrastructure reconnaissance plays a key role in assessing the requirements that are associated with providing essential services. (See FM 3-34.170 for additional information.)

5-44. As the area of operations matures, the general engineering effort may transfer to theater support contracts or external support contracts (Army Logistics Civilian Augmentation Program, Air Force Contract Augmentation Program, Navy global contingency construction contract). Engineer planners must understand the availability of (and the procedures for) employing HN support, DOD contracting, and local

purchases. Initially, there may be a need to deploy an advance party (heavy with logistics and engineering support) if the area of operations does not have the infrastructure to support the operation. In other circumstances, it may be necessary for the commander and a small group of specialized key personnel (civil affairs, public affairs, brigade judge advocate) to lead the advance party.

5-45. During the planning of nonlethal effects, engineers share their knowledge of public works systems and reconstruction efforts in an attempt to effectively and efficiently focus efforts. In DSCA, engineers support the commander's public affairs program by providing updates on engineering projects that support relief and recovery.

Protection

5-46. In stability, engineers play a major role in protecting positions, headquarters, support facilities, base camps, and highly vulnerable assets. In addition to protecting U.S. and unified action partners, consideration must also be given to protecting contractors and local workers. Stability is often decentralized to the battalion, company, or platoon level. Engineer support requirements for protection may stretch throughout the area of operations as the BCT positions troops where they can best stabilize the situation. Every unit has an inherent capability to provide basic survivability, which can be supplemented with combat engineering equipment to establish lower-end hardening with earth berms and gabion barriers. The most effective protection level can only be provided by general engineers or civilian contractors. In stability, the BCT may face explosive hazards. Engineers typically play a major role in coordinating the effort to reduce the effects on military forces, nonmilitary forces, and civilians.

5-47. In DSCA, the immediate effort is on protecting civilians from the elements or from the residual hazards of a disaster. Engineers can assist in erecting temporary shelters or prefabricated buildings. Engineer effort may include the construction of earth walls and berms to mitigate emergency flooding and preserve property. Army forces may also have a role in protecting federal property and federal government functions when the local authorities are unwilling or unable to do so.

5-48. Regardless of the BCT requirements in stability and DSCA, there most likely are not enough engineer assets (including civilian-contracted engineer support) available. This situation requires BCT units to construct their own fortifications and assist with other engineer tasks within their capabilities. In prioritizing the use of engineers and organic forces to accomplish the engineer tasks, the BCT commander emphasizes the strengthening of protection measures.

CIVIL AFFAIRS

5-49. Engineer tasks that support civil affairs typically include engineer activities of nonmilitary organizations and military forces. The total engineer force of active and reserve military personnel, civilians, contractors, HN personnel, and allies constitutes primary resources for civil affairs. The BCT commander can use these resources to accomplish the engineer mission in the area of operations.

5-50. While civil affairs units retain responsibility for the overall conduct of civil affairs, Army forces have some inherent capability of supporting civil affairs. The integration of engineers, military police, health services, communications, transportation, and other SOF capabilities is essential to the overall effort. Engineer capabilities are applied to provide specific construction and other technical support. The engineer support must be fully integrated with the civil affairs plan. Integration occurs through the operations process activities and is facilitated by coordination among the engineer staff and civil affairs. The BCT may also form working groups under the civil affairs lead to ensure the integration of necessary capabilities.

CIVIL-MILITARY PROJECT COORDINATION

5-51. For prioritizing and resourcing civil-military construction and engineer projects, the BCT can form a working group, board, or project integration cell or use the civil-military operations center (if established) to plan, synchronize, and execute approved projects that achieve the commander's desired effects. Civil-military construction and engineer project nominations are submitted by subordinate unit commanders in the form of a statement of work. Projects are reviewed, prioritized, and presented to the BCT commander for approval. Once approved and resourced, the project is synchronized through an established format within the BCT and submitted through the BCT operations cell as a tasking, construction directive, or

execution order. The financial management staff officer (S-8), provost marshal, legal officer, and civil affairs are typical members of this process.

5-52. The engineer staff role in civil-military construction and engineering projects includes orchestrating infrastructure reconnaissance teams as required, coordinating for contracted construction or troop construction projects in support of approved civil affairs initiatives, and tracking the progress of ongoing projects. The engineer staff also coordinates for geospatial products that can facilitate construction activities and serves as the interface for (or initiates reachback to) USACE and other agencies to coordinate for planning products, technical support, and professional expertise. The engineer staff coordinates and collaborates with adjacent or higher-unit engineer staff sections to ensure unity of effort.

SPECIAL CONSIDERATIONS

5-53. Infrastructure reconnaissance is a multidiscipline task conducted by a base team that is augmented, as necessary, with additional expertise. The engineer staff is usually responsible for coordinating infrastructure reconnaissance, but they should rely on other branches for assistance, depending on the category or required expertise. The base infrastructure reconnaissance team includes expertise from engineer, civil affairs, preventive medicine, military police, and other disciplines. Augmentation from additional disciplines is provided when possible. (See FM 3-34.170 for additional information on infrastructure reconnaissance.)

5-54. In the operational environment, engineers at most echelons operate or interact with other unified action partners who participate in the military operation. Given the multitude of organizations and capabilities involved, it is important that engineer staffs at appropriate levels coordinate with these organizations to ensure that resources are focused to meet objectives. Establishing and maintaining an effective liaison with participating agencies are essential to achieving unity of effort. The civil-military operations center can be a focal point for this effort at the BCT level.

Chapter 6

Sustainment Support for Engineering

Army sustainment is the provision of the logistics, personnel service, and health service support that is necessary to maintain and prolong operations until successful mission completion is accomplished. Sustainment units enable engineer operations at the BCT and below level during offense, defense, stability, reconnaissance, and security missions.

PLANNING

6-1. During the operations process, engineer commanders and staffs must plan, prepare, execute, and continuously assess sustainment support for engineer capabilities. During the MDMP, engineer planners concurrently develop a sustainment plan while conducting other operational planning. To ensure an effective sustainment plan, the engineer planner must understand the engineer and supported unit mission, commander's intent, and support plan concept.

6-2. The development of the sustainment plan begins during mission analysis and is refined during war-gaming operations. Upon receipt of the mission, engineer planners initiate their portion of the logistics estimate process, which is described as an analysis of logistics factors that affect mission accomplishment. (See FM 6-0 for additional information.)

6-3. Engineer planners focus the logistics estimate based on upcoming mission requirements and the sustainment of subordinate engineer units that are organic and task-organized to the supported unit. The engineer planner predicts support requirements by determining the—

- Type of support required (maintenance, supply, transportation, medical).
- Quantity of support required.
- Priority of support required (type and unit).

6-4. After determining the support requirements, the engineer planner assesses the—

- Available sustainment resources (supported unit, parent unit, contractor, HN).
- Status of sustainment resources (location, maintenance, personnel).
- Time that sustainment resources are available to the engineer unit.
- Available resource methods.
- Shortfalls in the equipment and supplies that are needed to support the operation.

6-5. Close integration with the supporting BSB and FSC will help to simplify and accelerate the process of providing a common operational picture. Information is readily available across the BCT network by using the Force XXI Battle Command Brigade and Below, Medical Communications for Combat Casualty Care, and Battle Command Sustainment Support System.

6-6. After conducting the logistics estimate, engineer planners work with the supported unit S-4 and compare the requirements with the reported status of subordinate units to determine the specific amount of supplies that are needed to support the operation. These requirements are then coordinated with the BSB or FSC to ensure that necessary supplies are identified and resourced through next-higher stocks.

6-7. The engineer staff translates the estimate into specific plans that are used to determine the feasibility of support to maneuver unit COAs. After a COA is determined, the engineer staff incorporates the specific sustainment requirements into the supported unit base OPORD.

6-8. In each BCT, the engineer staff works with the appropriate sustainment planner and executor to track essential sustainment tasks that involve supporting engineer units. Accurate and timely status reporting

assists the engineer staff in providing the overall engineer status to the supported unit commander and allows the engineer staff to intercede in critical sustainment problems when necessary. The engineer staff also ensures that supplies needed by task-organized or augmenting engineer units are integrated into supported unit sustainment plans. Accurate and timely reporting and close coordination with sustainment planners, providers, and organic and augmenting engineer commanders and staffs are essential for successful mission execution.

6-9. Before mission execution, sustainment rehearsals are normally conducted at brigade, battalion, and company levels to ensure a smooth, continuous flow of materiel and services.

LOGISTICS

6-10. The operation tempo requires a constant vigilance by the logistician and engineer commander to ensure a constant flow of logistics. Supplies are pushed forward (the unit distribution method) when it is logistically feasible. Maneuver units typically rely on lulls in the tempo of an operation to conduct sustainment, but engineers do not usually have this opportunity since many of their missions occur during a lull in maneuver. This may deny them the opportunity to use the supply point method, which increases the need for engineers to plan for continuous, routine, and emergency logistics support.

6-11. The Army principles of logistics are defined in ADP 4-0. The application of these principles facilitates effective, efficient sustainment and enables operational success. Engineer commanders and staffs understand and use these principles while planning engineer operations. The logistics principles are discussed in the following paragraphs.

INTEGRATION

6-12. Integration requires deliberate logistics support, health service support, and personnel service coordination and synchronization between commanders and operational and sustainment planners to ensure that the BCT sustainment plan supports the BCT operational plan. Sustainment must be integrated into the tactical plan. Planners must examine the selected COA and ensure that it can be supported logistically.

6-13. Operational and tactical plans integrate sustainment support to create a synergy with the concept of operation. Engineer planners participate in, and evaluate the sustainment significance of, each phase of the operation during MDMP and create a clear and concise concept of support that integrates the commander's intent and concept of operation.

ANTICIPATION

6-14. Logistics commanders and staffs must understand and visualize future operations and identify appropriate required support. The BSB commander guides sustainment commanders and staffs to anticipate logistics requirements to fulfill rapidly changing operational plans. As the operational plan changes, logisticians within the BCT must be able to rapidly adjust and respond to logistics requirement needs and identify risks and shortfalls that must be mitigated and incorporated into the overall plan.

RESPONSIVENESS

6-15. The planner who anticipates is proactive—not reactive—before, during, and after operations. The ability of the force to seize and maintain the initiative, synchronize activities along the entire depth of the area of operations, and exploit success depends on the abilities of commanders, logisticians, and engineers to anticipate requirements. Engineers consider joint, multinational, contract civilian, and interagency assets when planning support for engineer operations. Engineers—

- Use available resources to the fullest extent, especially acceptable HN assets.
- Prioritize critical engineer activities based on the concept of operations.

- Anticipate engineer requirements based on war-gaming operations, concept drill rehearsals, incorporation of experiences, historical facts, and calculable resource characteristics.
- Participate in, and evaluate the engineer significance of, each phase of the operation throughout the MDMP.

6-16. The engineer staff at every echelon and the engineer unit commander forecast future requirements and accumulate the assets needed to accommodate contingencies. Engineer operations frequently require—

- High fuel consumption rates.
- Engineer-specific Class IX repair parts.
- Large amounts of Class IV construction and barrier materials.
- Demolitions for the offense and defense.
- Maintenance and transportation support.
- Financial services to support the local purchase and contracting of HN assets and materials.

SIMPLICITY

6-17. Engineer commanders and staffs establish priorities and allocate supply classes and services to simplify sustainment. Engineers use preconfigured loads of specialized classes of supply to simplify transport.

ECONOMY

6-18. The economy reflects the reality of resource shortfalls while simultaneously recognizing the inevitable friction and uncertainty of military operations. This requires commanders to set clear priorities when resourcing the operational plan. The priority of effort is established while balancing the mitigation of risk to the operation. Engineer commanders may improvise to meet the higher intent and mitigate risks.

SURVIVABILITY

6-19. Survivability is based on being able to protect support functions from destruction or degradation. Engineers help to ensure that sustainment means are survivable by constructing sustainment bases and clearing LOCs. (See ATP 3-37.34 for additional information on survivability.)

CONTINUITY

6-20. At the BCT level, continuity is achieved through a system of integrated and focused networks, cells, and communications. Sustainment cells and networks (such as the Battle Command Sustainment Support System and the continuous coordination among sustainment leaders) link the three sustainment elements of logistics, personnel services, and health service support to operations.

IMPROVISATION

6-21. Sustainment organizations must improvise to meet current needs and respond to unforeseen emergencies. They plan for and use HN supply assets, facilities, and equipment when possible. Specific damage assessment and repair procedures may also be implemented based on the need to improvise. Improvisation is not a substitute for good planning; requirements must be anticipated. However, improvisation can be a great strength and engineer personnel must recognize it as an advantage in meeting emergencies.

6-22. Extraordinary methods may be necessary to ensure success during operations. Sustainment planners attempt to push support forward to engineer units to ensure smooth combat operations. Sometimes, this is not feasible. In such cases, engineers improvise by making, inventing, devising, or fabricating what is needed. Engineers rely on engineer resource assessment results to evaluate the availability of materiel, resources, and terrain features that have engineer application (such as creating a demolition cratering charge by using common fertilizer and diesel fuel). (See FM 3-34.170 for additional information on engineer resource assessments.)

6-23. The engineer staff at all echelons is ultimately responsible for engineer logistics estimates and plans and the monitoring of engineer-related sustainment execution within the supported unit. When engineer elements are task-organized within the supported unit, the engineer staff recommends the most effective command or support relationship. The engineer staff—

- Writes the engineer annex and associated appendixes to the operation plan (OPLAN) or OPORD to support the commander's intent (including the recommended distribution for engineer-related, command-regulated supply classes and special equipment).
- Assists in planning the locations of engineer forward supply points for the delivery of engineer-configured loads of Class IV and V barrier material. (These sites are coordinated with the unit that is responsible for the terrain and with the appropriate S-4.)
- Assists in planning the location of engineer equipment parks for pre-positioning critical equipment sets (tactical bridging). (These sites are coordinated with the unit that is responsible for the terrain and with the appropriate S-4.)
- Coordinates for appropriate material-handling equipment to unload supplies and equipment at engineer forward supply points and engineer equipment parks.
- Works closely with the sustainment staff (including the HN sustainment staff) to identify available haul assets and recommends priorities to sustainment planners.
- Identifies extraordinary medical evacuation requirements or coverage issues for engineer units and coordinates with sustainment planners to ensure that the supporting unit can accomplish special workloads.
- Identifies critical engineer equipment and engineer mission logistics shortages.
- Provides the appropriate S-4 with an initial estimate of required Class IV and V supplies for countermobility and survivability efforts.
- Provides the appropriate S-4 with an initial estimate of required Class IV supplies in support of construction.
- Monitors advice implications (as required) of statutory, regulatory, and command policies for the procurement of construction materials. (A critical issue for the engineer staff is ensuring the timely delivery of materials that meet the required specifications, regardless of their source.)
- Tracks the flow of mission-critical Class IV and V supplies into support areas and forwards the information to supporting engineer units.
- Provides engineer assistance (as required) to accept the delivery of construction materials.
- Coordinates MSR clearing and tracks its status at the main command post.
- Coordinates with the EOD company for EOD support to missions that are out of engineer capability or capacity.
- Develops engineer SOPs and integrates engineer considerations into maneuver unit SOPs to facilitate the planning and execution of sustainment.
- Provides terrain visualization and analysis in support of sustainment planning.

BRIGADE ENGINEER BATTALION STAFF

6-24. The commander ensures that sustainment supports and maintains the fighting potential of the battalion and ensures that the battalion retains its ability to enhance the combat power of the BCT. The battalion commander provides critical insight during BCT planning and provides guidance on battalion sustainment requirements within the BCT. The engineer battalion staff—

- Coordinates sustainment support requirements that are external to the engineer unit.
- Anticipates problems, works to avoid planning and transition delays, and conducts sustainment battle tracking.
- Communicates with subordinate leaders to identify the need for push packages, ensures push package arrivals, and tracks push package expenditures.
- Positions and monitors unit resupply points.
- Executes sustainment tasks according to the supported-unit SOP and OPORD.
- Monitors engineer equipment locations and the maintenance status.

- Adjusts engineer-specific Class IV and V supply requirements based on the reconnaissance of mission sites.
- Monitors engineer equipment use, maintenance deadlines, and fuel consumption.
- Establishes systems for receiving, consolidating, and forwarding logistics, administrative, personnel, and casualty reports to the parent or supported unit.
- Provides proper medical support within the unit and properly coordinates additional support requirements.
- Establishes systems for the evacuation of casualties, detainees, and damaged equipment.
- Assigns personnel replacements.
- Conducts sustainment rehearsals at the company level.
- Performs proper unit field sanitation activities.
- Integrates EOD support as necessary.

FORWARD SUPPORT COMPANY

6-25. The BEB is supported by an FSC and by elements from the distribution and supply company, field maintenance company, brigade support medical company, and the brigade support medical company located within the BSB. The FSC is the link between the BSB and the engineer battalion and is the organization that provides BCT, battalion, and BSB commanders with the greatest flexibility for providing logistics support to the BCT.

6-26. Each FSC is organized to support a specific combined arms, cavalry, infantry, engineer, and fires battalion. FSCs provide field feeding, fuel, ammunition, field maintenance, and distribution support to a battalion and are structured similarly, with the most significant differences being in the maintenance capabilities.

6-27. The FSC commander is the senior logistician for the supported engineer battalion. The FSC commander assists the engineer battalion S-4 with the battalion logistics plan and is responsible for executing the logistics plan according to the BSB and supported engineer battalion commander's guidance. Integrating the logistics plan early into the supported engineer battalion S-3 OPLAN helps mitigate logistic shortfalls and support the commander to seize, retain, and exploit gains.

6-28. FSCs are assigned to the BSB and receive technical logistic directions from the BSB commander. This allows the BSB commander and BSB support operations officer to task-organize FSCs and cross-level assets among FSCs when it is necessary to evaluate the logistics support to the BCT. The task organization of FSCs is a collaborative, coordinated effort that involves analysis by the staff and consensus among commanders within the BCT. Because FSCs are assigned to the BSB, they depend on the BSB for administrative support, logistic support, and technical oversight.

6-29. An FSC may be attached to, or placed under operational control of, the supported battalion for a limited amount of time or for a specific mission of phase of an operation. The decision to establish the type of command relationship is made by the BCT commander on the advice of the BSB commander after careful and thorough mission analysis. Commanders must understand that these types of command relationships limit the flexibility of the BSB commander (and, ultimately, the BCT commander) to support the BCT.

6-30. FSCs normally operate in close proximity to the supported battalion. The location of the FSC is determined by the supported battalion. The distance that separates the FSC and the battalion depends on METT-TC, with logistics asset force protection and required resupply turn-around times being key considerations.

6-31. FSCs may be divided, with some elements colocated with the supported battalion and some elements located in the brigade support area. For example, it may be desirable to locate FSC field maintenance teams with the supported battalion and the remainder of the FSC in the brigade support area. This type of task organization must be determined by the FSC commander in collaboration with BSB and maneuver battalion commanders.

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Glossary

The glossary lists acronyms and terms with Army or joint definitions.

SECTION I – ACRONYMS AND ABBREVIATIONS

ABE	assistant brigade engineer
ADAM	aerial denial artillery munition
ADP	Army doctrinal publication
ADRP	Army doctrine reference publication
AJP	allied joint publication
ATP	Army techniques publication
attn	attention
ATTP	Army tactics, techniques, and procedures
BCT	brigade combat team
BEB	brigade engineer battalion
BSB	brigade support battalion
C-E	communications-electronics
CBRN	chemical, biological, radiological, and nuclear
COA	course of action
DA	Department of the Army
DC	District of Columbia
DOD	Department of Defense
DSCA	defense support of civil authorities
EAB	echelons above brigade
EOCA	explosive ordnance clearance agent
EOD	explosive ordnance disposal
FID	foreign internal defense
FM	field manual
FSC	forward support company
GTA	graphic training aid
HN	host nation
HUMINT	human intellingence
IED	improvised explosive device
IPB	intelligence preparation of the battlefield
ISR	intelligence, surveillance, and reconnaissance
JFOB	joint forward operations base
JP	joint publication
LNO	liaison officer
LOC	line of communications

MDMP	military decisionmaking process
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, and civil considerations
MI	military intelligence
MISO	military information support operations
MO	Missouri
MSCoE	Maneuver Support Center of Excellence
MSG	multisensor ground
MSR	main supply route
No.	number
OPLAN	operation plan
OPORD	operation order
Prime BEEF	Prime Base Engineer Emergency Force
RAAM	remote antiarmor mine
RED HORSE	Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer
S-1	manpower and personnel staff officer
S-2	intelligence staff officer
S-3	operations staff officer
S-4	logistics staff officer
S-6	signal staff officer
S-7	inform and influence activities staff officer
S-8	financial management staff officer
SOF	special operations forces
SOP	standard operating procedure
TC	training circular
TM	technical manual
TUAS	tactical unmanned aerial system
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
UXO	unexploded ordnance

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None.

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By Order of the Secretary of the Army

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