CHAPTER 4

DEFENSIVE OPERATIONS

This chapter deals with planning and executing the defense. It does not attempt to deal with all tactical issues facing the defending TF. It focuses on the interface that must be achieved to synchronize the engineer company into the TF's defensive preparations.

DEFENSIVE CHARACTERISTICS

To support the defense, the engineers must understand defensive characteristics and their relationship to engineer operations. The characteristics of the TF's defense are—

- Preparation.
- Security.
- Disruption.
- Mass and concentration.
- Flexibility.

PREPARATION

Defenses have a distinct preparation phase. Engineer synchronization is vital to the TF's success. The engineer company is a critical component in setting the conditions for combat and giving the TF a decisive edge against the attacking enemy.

Engineer planning and preparation must not only provide a centralized focus for the defense but also allow for decentralized integration and execution. Engineer preparations in the defense are time-, manpower-, equipment-, and material-intensive. With no time to waste, the TF engineer must quickly identify engineer requirements. His dilemma is that the details of the TF plan will not be complete until the staff has time to conduct tactical planning and commanders have conducted personal reconnaissances. He must identify those requirements for survivability positions and obstacles that are not likely to change so that he can get engineers to work. As the plan matures, the TF engineer adjusts the supporting engineer plan through clear FRAGOs to his subordinates.

SECURITY

The defending TF provides security to conserve combat power for use elsewhere. The purpose of security in the defense is to coordinate and synchronize the defense, to provide early warning, and to disrupt the enemy attack early and continuously. The TF provides security through counterreconnaissance forces, deception, fortification, and protective-obstacle construction. The engineer company can emplace obstacles to support the counterreconnaissance screen and to disrupt the enemy's advance through the TF's sector.

DISRUPTION

The division and brigade attempt to disrupt the enemy's effort through deep, security, and deception operations. The TF fights as part of these operations. The engineer company constructs directed obstacles to disrupt the enemy forward of the EA and provides breaching capability to assist the TF during the fluid battle. The TF engineer plans and executes situational obstacles to disrupt follow-on enemy forces. Deception operations employ a combination of forces and obstacles to cause the enemy to commit forces prematurely against a falsely perceived weakness.

MASS AND CONCENTRATION

The TF seeks to concentrate its fires to exploit or create an enemy weakness. The

engineer company supports the concentration of fires by constructing obstacles and fortifications and by providing mobility to counterattacks or reserve companies/teams. Obstacles are employed to directly attack the enemy's ability to maneuver. Tactical obstacles are integrated into the TF's direct-fire plan to enhance the terminal effects of those fires. Obstacles turn, block, fix, or disrupt the enemy's formations, allowing concentrated fires to create and exploit enemy weaknesses (see Figure 4-1).

The company also constructs fortifications as the TF emplaces protective obstacles, allowing the TF to survive the enemy's fires and break up his final assault. Defending from survivable positions is a key factor in maintaining concentrated fires until the enemy is destroyed. The engineer company provides mobility to the TF's counterattack or reserve, allowing the TF to exploit a broken enemy attack rapidly.

FLEXIBILITY

The TF must retain flexibility to counterattack or react to a deviation plan. Engineers assist the TF in maintaining flexibility through situational obstacles in the main battle area (MBA), task-organizing for rapid transition to the offense, and providing quick breaching capability for repositioning companies/teams. The engineers plan to use situational obstacles in the main EAs as "be-prepared (B/19 missions." Situational obstacles can be employed separately or can be

Obstacle-effect graphic	Application	Examples of conveying intent
Disrupt	Short arrows indicate where the enemy is attacked by obstacles. Long arrows indicate where bypass is allowed and attacked by fires.	
Turn	Heel of arrow is anchor point. Direction of arrow indicates where enemy advance is slowed by obstacles.	
Fix	Irregular part of arrow indicates where enemy advance is slowed by obstacles.	
Block	Vertical line indicates limit of enemy advance. Vertical line also indicates where the obstacle ties no-go terrain.	
		Direction of enemy attack

Figure 4-1. Obstacle-effect graphic

used to reinforce existing obstacles in the EA. The TF engineer plans for the TF's mobility by preparing his company for the rapid breaching of enemy situational obstacles or friendly obstacles that impede the TF's offensive transition.

DEFENSIVE PATTERNS

There are two traditional defensive patterns: the mobile defense and the area defense. The fundamental difference between the two is their focus. The TF engineer must understand both defenses to effectively tailor his SOEO to support the TF commander's chosen pattern.

MOBILE DEFENSE

The mobile defense's focus is to destroy the enemy attacker. This defense is organized to allow the enemy to advance to a position where he can be destroyed by a counterattack or a large reserve. This defense trades space for time to achieve a decisive advantage against the attacker. Engineers concentrate on constructing obstacles to attack the enemy's freedom of maneuver and use mobility to preserve the strike-force reserve's mobility.

Obstacle planning is linked to the most likely enemy COA rather than to a specific piece of terrain. Mobile-defense obstacle planning is more restrictive than permissive, and it reduces the flexibility of the companies/teams. This allows massed obstacle effort at areas that are crucial and preserves mobility for counterattacking forces.

Survivability is also tailored to a force-oriented defense. The TF must fight the depth of its sector from multiple battle positions. Fortification efforts must support fighting quick engagements from multiple positions by providing primarily hull-down positions in both primary and subsequent battle positions. Protective-obstacle requirements are concentrated in the final subsequent positions where the penetration must be blunted to allow the counterattack.

The enemy is destroyed in the mobile defense by a large counterattacking reserve. The engineer company supports this reinforced company/team in two ways. First, the engineer company's obstacle-control measures ensure that the TF's obstacle efforts do not limit the mobile reserve's freedom to maneuver. Second, the engineer company ensures that the mobile reserve has the necessary dedicated engineer support to maintain mobility during the counterattack. The engineers that are a part of the counterattack must be able to counter the enemy's situational obstacles or reduce friendly obstacles as required by changes to the situation. The TF engineer must weigh the trade-off between the counterattack and the obstacle and survivability requirements of the TF's MBA when he allocates engineer forces, assets, and resources.

AREA DEFENSE

Area defense focuses on retaining terrain. The area defense is designed to absorb the enemy into an interlocking series of positions from which he can be destroyed. The interlocking nature of defensive fires, obstacles, and small, local reserves are the mechanism for the enemy's defeat. The area defense does not focus on the outright destruction of the enemy, but on denying the enemy key terrain. Frequently in an area defense, the engineer company will concentrate on strongpoint preparation. This operation requires extensive materials and equipment and is characterized by extensive fortification and obstacle construction.

The SOEO focuses on retaining terrain and enabling the TF to concentrate fires from fixed positions. Locating and analyzing key and decisive terrain plays a major role in the organization of the area defense and becomes the focus of the obstacle and survivability effort.

The survivability effort must enable the companies/teams to concentrate fires from

fixed positions. The TF engineer must be sensitive to increased fortification requirements. To fight from fixed positions, the companies/teams may require primary, alternate, and supplemental turret-defilade positions. The heavier survivability effort also requires a larger and more substantial protective-obstacle effort that breaks the enemy's final assault. The tactical-obstacle effort must be well-synchronized between the companies/teams to ensure mutual support and interlocking obstacle groups.

ENGINEER PLANNING FOR DEFENSIVE OPERATIONS

The TF engineer's role is to identify missions, allocate resources, and synchronize and command engineer functions. Countermobility and survivability are the engineer company's primary missions. Therefore, planning for these missions are the TF engineer's initial essential tasks. FMs 90-7 and 20-32 cover in great detail the mechanics, tactics, and procedures for obstacle planning and integration.

The focus of defensive planning is to integrate and synchronize obstacles and fortifications into the TF's direct- and indirect-fire plans. This planning is directive and detailed in nature and focuses on the determination of obstacle groups and the type and amount of prepared positions. Actual obstacle siting and emplacement and position location are the purview of the company/team commander and the supporting engineer platoons.

TF-level defensive planning is part of the tactical decision-making process. The EBA process provides the basis for integrating defensive planning with the decision-making process.

ANALYZE THE MISSION

The key activities during the mission analysis are to—

- Determine facts and assumptions.
- Analyze relative combat power.
- Analyze the engineer battalion's/brigade's mission and the commander's intent.
- Issue the commander's guidance.

DETERMINE FACTS AND ASSUMPTIONS

Defensive planning starts with the receipt of a mission to defend. The company XO and the Battlefield Information Control Center (BICC) (or the TF engineer and the S2) begin by developing a SITEMP that includes a modified combined obstacle overlay (MCOO). The MCOO is a product developed during the IPB process. The MCOO development is a joint effort of the engineer and intelligence sections of the TF's TOC.

The MCOO should define the AAs and mobility corridors within the TF's AO. This information is vital to obstacle planning. Obstacles are placed on AAs to attack enemy maneuver. The AA analysis also details potential EAs. The MCOO also highlights areas where fortification is not feasible because of soil type, terrain restrictions, or limited fields of fire. It also indicates where forces can defend with limited survivability construction because the reverse slope or undulating terrain provides natural concealment and cover.

The threat evaluation and enemy COA development detail how the enemy will potentially attack. They also provide an insight as to what and where the enemy's objective and routes might be. The SITEMP helps the engineer to understand how the enemy will traverse through the TF's sector and allows the engineer to gain an understanding of how and where he can best attack the enemy's maneuver.

The SITEMP also depicts how the enemy's reconnaissance forces will enter the sector. This is especially important to counter the enemy's ability to reconnoiter obstacle and fortification efforts.

The engineer must articulate the current capabilities of the engineer company, its current combat power, and its ability to support the TF. Assumptions on future capability or potential reinforcement by other engineers should be analyzed. Specific characteristics of special engineer equipment and SCATMINE systems are detailed for the staff. An initial Class IV/V supply-point location and operation plan should be developed with the TF staff (note that the TF has responsibility for Class IV/V supply-point operation). The XO/lSG works with the TF and the engineer battalion S4 to ensure that delivery of Class IV/V barrier material is synchronized with the execution.

ANALYZE RELATIVE COMBAT POWER

The engineer compares friendly and enemy combat power and identifies possible obstacle and fortification requirements that offset potential enemy breaching and direct- and indirect-fire capabilities. The actual inclusion of the obstacles normally occurs after COA development. During this phase, the engineer finishes his EBA to gain an understanding for the engineer company's ability to support the TF.

ANALYZE THE ENGINEER BATTALION'S/ BRIGADE'S MISSION AND THE COMMANDER'S INTENT

The staff analyzes and identifies information from the engineer battalion/brigade order and commander's intent that will potentially impact defensive planning. The engineer analyzes the maneuver brigade and engineer battalion commanders' intent to determine potential obstacle placement, obstacle intent, and construction priority based on his concept of the operation. If not given in the higher order, the engineer must determine the intent for the obstacle belts in the higher order as well as the fortification priority.

The TF must identify tasks and limitations imposed from the brigade OPORD. These might include obstacle belts with or without specific intents, obstacle-restricted areas, or restrictions on the type of obstacles. Also, the brigade OPORD might specify reserve, situational, or directed obstacle groups or the minimum level of survivability.

The engineer must identify the TF's total obstacle and fortification capabilities. Available assets include engineer units, SCATMINE systems, and infantry units that can provide additional manpower for obstacle construction. Engineer equipment status and work rates must be considered. Appendix D details the engineer company's defensive planning factors. Time must also be considered.

ISSUE COMMANDER'S GUIDANCE

The TF commander should be as specific as possible with his initial obstacle and fortification guidance. If the commander narrows the COA focus, he may also provide obstacle or fortification guidance. His guidance is a key factor in an early start and must be solicited if not offered.

COURSE-OF-ACTION DEVELOPMENT

Detailed planning begins following the COA development. The engineer focuses on five specifics in his SOEO for the defensive plan, including—

- Direct-/indirect-fire analysis.
- Obstacle-intent integration.
- Obstacle priority.
- Fortification priority.
- Mobility requirements.

DIRECT-/INDIRECT-FIRE ANALYSIS

The direct-/indirect-fire analysis examines how engineers can best use obstacles (within the commander's intent) to enhance the direct-/indirect-fire plan. The COA sketch includes the minimum maneuver graphics for the staff to plan. Fire-control measures indicate where and how the TF's direct-fire weapons mass, shift, or lift to destroy the enemy. The staff should annotate direct-fire weapons-range fans on this overlay to gain an appreciation of the direct-fire coverage. This analysis can be used to formulate obstacle locations with the direct-fire plan. The engineer must have a fundamental understanding of the direct-/indirect-fire and maneuver plans and the TF's organization of the EA to effectively integrate obstacles with the direct-/indirect-fire plan.

The direct-fire plan also illuminates which companies/teams will require fortification based on their position with respect to the terrain. The engineer must understand the purpose of each company/team to determine its fortification requirements. Synchronization of direct and indirect fires with obstacles multiplies the relative effect on the enemy. An obstacle is an excellent location for preplanned artillery and mortar fires. These fires can eliminate dismounted breaching efforts. The indirect fires contribute to the threat's ability to breach, making the obstacle more effective and providing direct-fire systems a higher probability of kill.

OBSTACLE-INTENT INTEGRATION

The engineer determines locations for the directed obstacle groups. Groups are placed on the COA overlay to support the maneuver plan. This location is for planning only and normally will be adjusted after the ground reconnaissance.

Obstacle groups target specific enemy elements based on the SITEMP. The engineer generally allocates an obstacle group against a battalion-sized AA. This approach mirrors the staff's placement of a company/team against the same enemy force. The company's/team's fire responsibility drives the placement of the obstacle groups. The engineer advises the commander on which specific effect each directed obstacle group must achieve. He plans obstacle groups to—

- Disrupt the enemy.
- Turn the enemy into an area where friendly units can mass fires.
- Fix the enemy in the EA and enhance his direct-fire destruction.
- Block the enemy from using an AA.

The engineer integrates directed obstacle groups with the COA. The obstacle effects are shown on the COA overlay using obstacle-effects graphics. The engineer draws the obstacle-group graphic to reflect the location, target, and specific intent of the group as accurately as possible. The engineer should visualize the terrain and how it naturally effects maneuver. Terrain visualization is vital to proper obstacle-group design.

OBSTACLE PRIORITY

The staff determines the priority of each group depicted on the overlay. Priority is established by the commander's intent and the most likely enemy COA. The obstacle priority should reflect the TF's greatest obstacle requirement. The primary obstacle effort can be with an economy of force where the commander needs more obstacles to overcome a shortage of direct-fire systems. The TF engineer should be cognizant of flank protection, weapons types and ranges, and the overall commander's intent for the entire force before placing obstacle priority on the main EA. Priorities assist the engineer in allocating resources and ensuring that the most critical obstacle groups are emplaced first.

FORTIFICATION PRIORITY

The SITEMP, the fire analysis, and the purpose of each company/team provide insight to derive the TF's fortification requirements. Soil conditions and weather must be considered, along with the equipment capability, to

determine the potential number of positions that can be constructed. A company serving as a counterattacking force does not need the survivability effort that a blocking team needs. Soil conditions or terrain could preclude fortification. All of the above must be considered to analyze the TF's fortification potential.

MOBILITY REQUIREMENTS

The engineer identifies the TF's mobility requirements. Obstacle groups should not be arrayed along potential counterattack routes or where there is a potential to hamper unit repositioning. Mobility assets should be used to counter potential enemy situational obstacles and friendly obstacles that might hinder friendly maneuver. The TF engineer must consider the commander's mobility requirements and plan for mobility assets to be ready when and where needed. For example, if the commander has a tank company positioned to attack the enemy's flank, the engineer must ensure that the company can get to the flank. This can be done through planned lanes or obstacle-restricted areas or by placing breaching assets with the company to provide critical mobility and immediate response to enemy situational obstacle threats.

COURSE-OF-ACTION ANALYSIS

The staff war-games the COA to determine its viability and to determine the best COA to recommend to the commander. The engineer refines the SOEO during this process as well. Obstacles and fortifications should be considered within the context of the maneuver COA. Some specific areas that the engineer staff officer should consider are-

- Enemy reactions at the obstacle groups (breaching or bypassing capability) versus the desired obstacle effect.
- Enemy breaching capabilities that make one obstacle type preferable to another (such as a tank ditch versus a minefield).
- Obstacle locations that hinder friendly maneuver.
- The compatibility of obstacle effects and weapons-systems capabilities.
- Adequate direct-/indirect-fire-control measures, as well as targeting that supports the obstacle effect. Effects of artillery and obstacles must be synchronized to gain the desired effect on the enemy's maneuver.
- Locations of suspected enemy artillery concentrations that make one type of fighting position preferable to another.
- Locations and types of enemy situational obstacles that make one type of breaching asset preferable to another.

The staff adjusts the COA after war gaming, including the obstacle and fortification plan, as follows:

- Obstacle-group location changes.
- Obstacle-effect changes.
- Additional situational-obstacle groups.
- Additional reserve-obstacle groups.
- Fortification effort, type, or priority changes.
- Identification of other mobility requirements.
- Refinement of artillery targets based on obstacle group changes.

MOBILITY REQUIREMENTS

The staff determines which obstacles require lanes and the closure criteria for these lanes. They also determine obstacle-restricted areas that support the TF's maneuver. Lanes and bypasses are determined using tactical repositioning requirements developed during the COA analysis. Requirements for rehearsal movement, TRP

placement, and logistical support of forward TF elements are also considered in lane development. Mobility requirements identified during COA development are synchronized and refined during COA analysis. Additional mobility requirements identified during war gaming are resourced and planned for.

Table 4-1. Resource factors

Minefield	Resource Factor
Disrupt	0.5
Fix	1.0
Turn	1.2
Block	2.4

OBSTACLE DESIGN AND RESOURCING

After the COA analysis, the engineer conducts a detailed study of the obstacle plan to determine the resource requirement. Groups are resourced using the width of the mobility corridor and the resourced factors from Table 4-1. The size of the mobility corridor is determined from the MCOO. The corridor width multiplied by the resource factor will give a resource allocation for that corridor and effect. The TF engineer resources the obstacle groups based on their assigned priorities. Once the engineer has developed the resource requirements for the obstacle groups, he plans the individual obstacles within the group.

If time permits, a detailed ground reconnaissance of the obstacle-group location can be conducted. This will allow a more detailed analysis of the obstacle requirement for that AA, and then individual obstacles can be planned by the engineer. However, usually the engineer will only designate the intent to guide the companies/teams. The company/team commanders and their supporting engineers will complete the actual design of the individual obstacles within the obstacle groups.

DECISION AND EXECUTION

The engineer makes adjustments to the SOEO based on the COA that the commander approves. The engineer then provides either an oral, written, or graphical order with sufficient detail to allow the subordinate units to conduct the operation. The engineer provides critical information using the—

- Scheme-of-obstacle overlay.
- Obstacle-execution matrix.
- Survivability matrix and time line.

SCHEME-OF-OBSTACLE OVERLAY

The scheme-of-obstacle overlay depicts the location of the TF's obstacle groups, brigade-directed obstacle groups (if any), and obstacle belts within the TF's sector. The overlay also includes any obstacle restrictions dictated from a higher headquarters. The overlay depicts the obstacle groups using the standardized obstacle-effect symbols shown in Figure 4-1, page 4-2. The overlay does not generally show individual obstacles unless the engineer has had sufficient time to conduct a thorough ground reconnaissance where exact obstacle locations have been identified. The engineer must exercise extreme caution if he uses individual obstacles on the overlay. He must ensure that inexperienced leaders do not attempt to emplace obstacles exactly as shown on the overlay, but instead, properly site the obstacle with the company/team commander. The TF scenario presented later depicts an example of a TF scheme-of-obstacle overlay. The scheme-of-obstacle overlay graphically depicts how the commander seeks to influence enemy maneuver through obstacles.

OBSTACLE-EXECUTION MATRIX

The obstacle-execution matrix includes specific instructions and detailed information concerning the obstacle groups shown on the scheme-of-obstacle overlay. Figure 4-2 shows a directed-obstacle-execution matrix.

Zone/Belt/ Group/ Obstacle Number	Location	Effect	Priority	Emplacing Unit	Owning Unit	Lane Location	Lane-Closure* Responsibility	Materials/Assets Required	Materials Location	Special Instructions
A1A	NK 312568	Turn	1	A 78 Engr	A-1/63 AR	N/A	N/A	1200M15	NK 310568	
A1B	NK 315002	Fix	3	1/B 78 Engr	B-1/63 AR	N/A	N/A		NK 315002	
A1C	NK 311085	Block	2	2/B 78 Engr	C-1/63 AR	NK 311082	Scouts V63AR	360-can. Volcano	NK 311085	Volcano 48-hour duration. Approved by corps commander

*Reference to reserve-obstacle-execution matrix

Figure 4-2. Directed obstacle-execution matrix

A directed-obstacle-execution matrix should include the following information:

- The zone/belt/group designation and individual obstacle numbers, to include situational obstacles.
- The location.
- The obstacle effect for the group.
- The priority of the group.
- The emplacing and owning unit.
- Locations of lanes or bypasses.
- Lane-closure responsibility and closure resource location.
- The material allocation or assets allocated to the group.
- The Class IV/V supply-point responsibility.
- The location of obstacle materials and Class IV/V supply-point locations.
- Any special instructions, such as triggers or firing-party procedures.
- Obstacle repair instructions.

SURVIVABILITY MATRIX AND TIME LINE

The survivability time line includes specific instructions and detailed information concerning the TF's fortification effort. Normally, the A&O platoon leader controls the equipment and ensures that fortification construction is complete according to the survivability matrix and time line. He is the TF engineer's primary agent for construction during defensive preparation. As a minimum, these products should include the following information (see Figure 4-3):

- The survivability priority for the type of position and the type of system.
- The company/team priority.
- The number, type of position, and time allotted to fortify each TF element.
- The location.
- The allocation of equipment.
- The maneuver point of contact (POC) with each element, including the call sign and frequency.
- Any special instructions, such as disengagement triggers, follow-in construction tasks, or equipment rally points.

TASK-FORCE OBSTACLE SCENARIO

The following is a scenario that highlights some considerations for defensive planning at the TF level:

The TF commander has the mission to defend in sector to defeat an enemy regiment. Based on the TF's mission, the commander directs the staff to develop a COA (see Figure 4-4, page 4-12). The scouts will screen forward. Teams A and C and Company D defend from battle positions (BPs) A, C, and D, respectively, to mass direct and indirect fires in EA Dog. Team B defends along a secondary AA in the south from BP B. On order, Team B repositions to a subsequent BP to support the fight in EA Dog.

The engineer develops an obstacle plan to support the COA. First, he analyzes the fire plan to determine the areas where fires are massed to destroy the enemy. He sketches in rough range fans based on the probable weapon systems in each BP. These areas suggest locations where the engineer can integrate obstacles with fires (see Figure 4-5, page 4-12). The engineer selects locations for directed obstacle groups. He confines the obstacle-group locations to obstacle belt A1, which was identified during mission analysis. He uses obstacle-effects graphics to show the relative location of the obstacle groups and to indicate the desired obstacle effect. The obstacle groups target enemy battalion-size formations (see Figure 4-6, page 4-13). The engineer coordinates with the FSO to ensure that indirect fires are planned to support and reinforce the desired obstacle effect. Finally, the TF engineer sets priorities for the obstacle

Start Complete	Location	Priority	Type Position	Number of Positions	Overwatch Unit	Linkup Location, POC, Call Sign, and Frequency	Special Instructions
31 0001- 31 1000	NK 111898	1	2 tier	8	A 1/63	BP1	
31 0001- 31 1000	NK 113890	3	Hull down	14	B 1/63	BP2	CSE plt (DS)
31 0001- 31 1000	NK 104780	2	2 tier hull down	8/4	C 1/63	BP3	A - 78th Engr (DS)
31 1100- 31 1500	NK 112800	4	Modified 2 tier	10	D 1/10	BP4	
31 1800- 31 1900	NK 109800	5	Hull down	2	TOC	NK 109800	
31 2400- 31 0600	NJ 099800	8	Hull down	8	Trains	NJ 099800	
31 0600- 31 1200	NK 104775	7	Dismount crew	8	ADA	NK 104775	
31 1800- 31 2400	NK 111795	6	Hull down	6	Mortars	NK 109800	

Figure 4-3. Survivability matrix

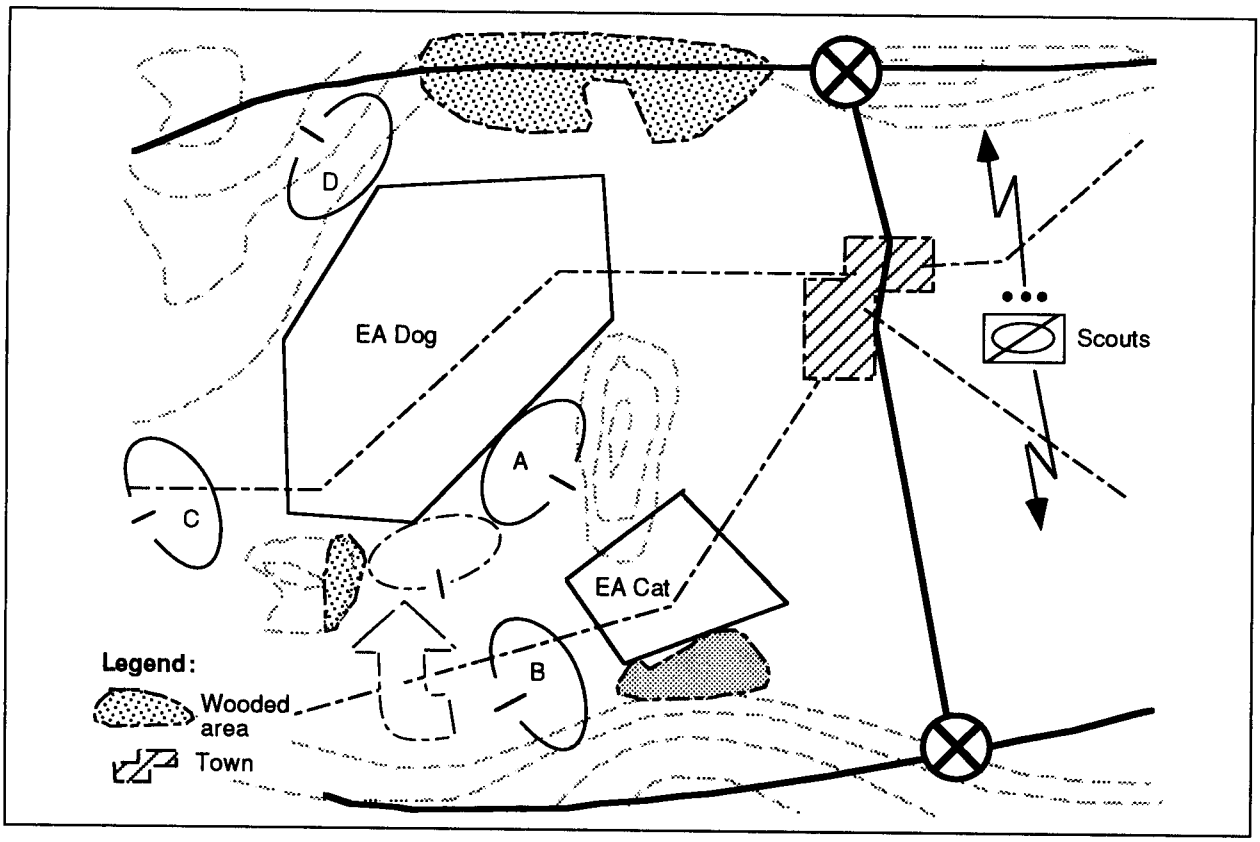

Figure 4-4. TF defense plan

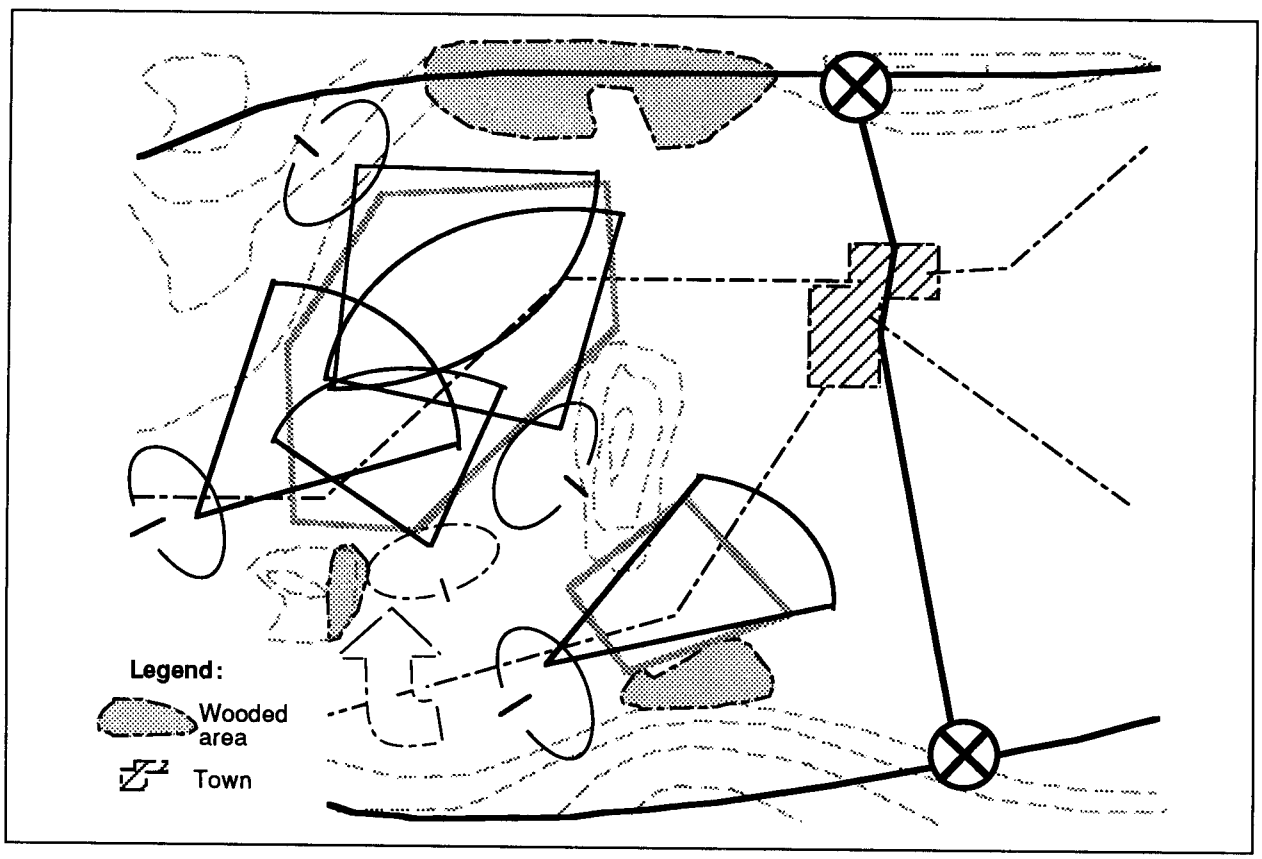

Figure 4-5. TF direct-fire analysis

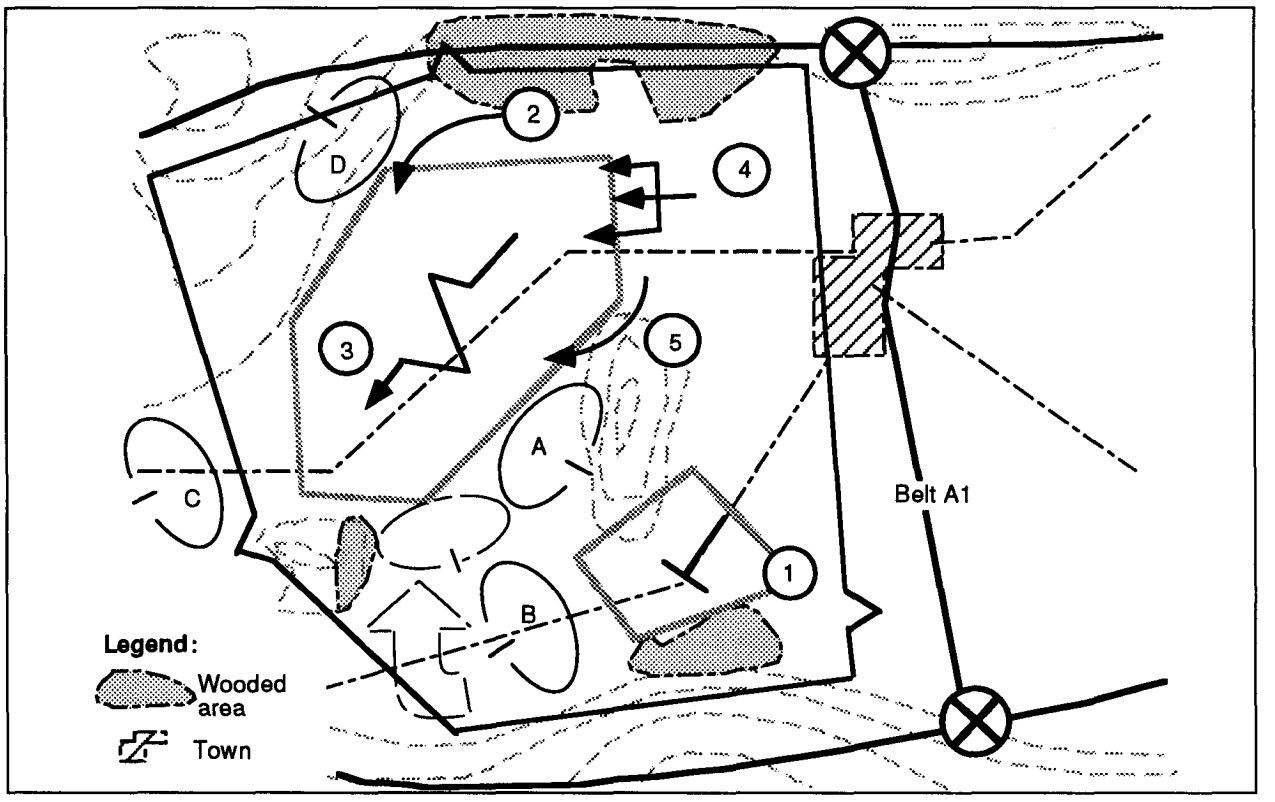

Figure 4-6. Obstacle effects integrated with TF plan

groups based on the importance of the obstacle group to the success of the COA and the commander's guidance on obstacles. Figure 4-6 also shows the priorities that support the commander's desire to stop the enemy in the south, to force him to piecemeal into the EA, and to destroy him in EA Dog.

The engineer also develops a fortification plan and a survivability matrix and time line to support the COA. He prioritizes the fortification effort by maneuver element and allocates equipment, time, and number and type of positions to each maneuver element. Figure 4-7, page 4-14, shows the priorities that support the commander's intent to protect the force while it destroys the enemy entering the EA.

The staff analyzes the COA and makes adjustments based on the analysis. These adjustments include the addition of a situational-obstacle group to support the withdrawal of the scouts. The engineer also identifies mobility requirements. These requirements include lanes for passage of the TF scouts and marked bypasses in the EA to support EA rehearsals. He also recommends that Team B have four tank plows to ensure that they can freely reposition to fire into EA Dog. Figure 4-8, page 4-14, shows the situational-obstacle group and mobility requirements annotated on the obstacle plan. The engineer conducts obstacle design and resourcing for the obstacle plan.

Following the commander's decision to accept the COA as is, the engineer finalizes the obstacle plan. The final plan includes a scheme-of-obstacles overlay and obstacle-execution matrixes. The engineer also coordinates for obstacle overwatch and patrolling with the maneuver team commanders. He also plans for subsequent engineer rally points and *defensive positions, should the enemy attack earlier than expected.*

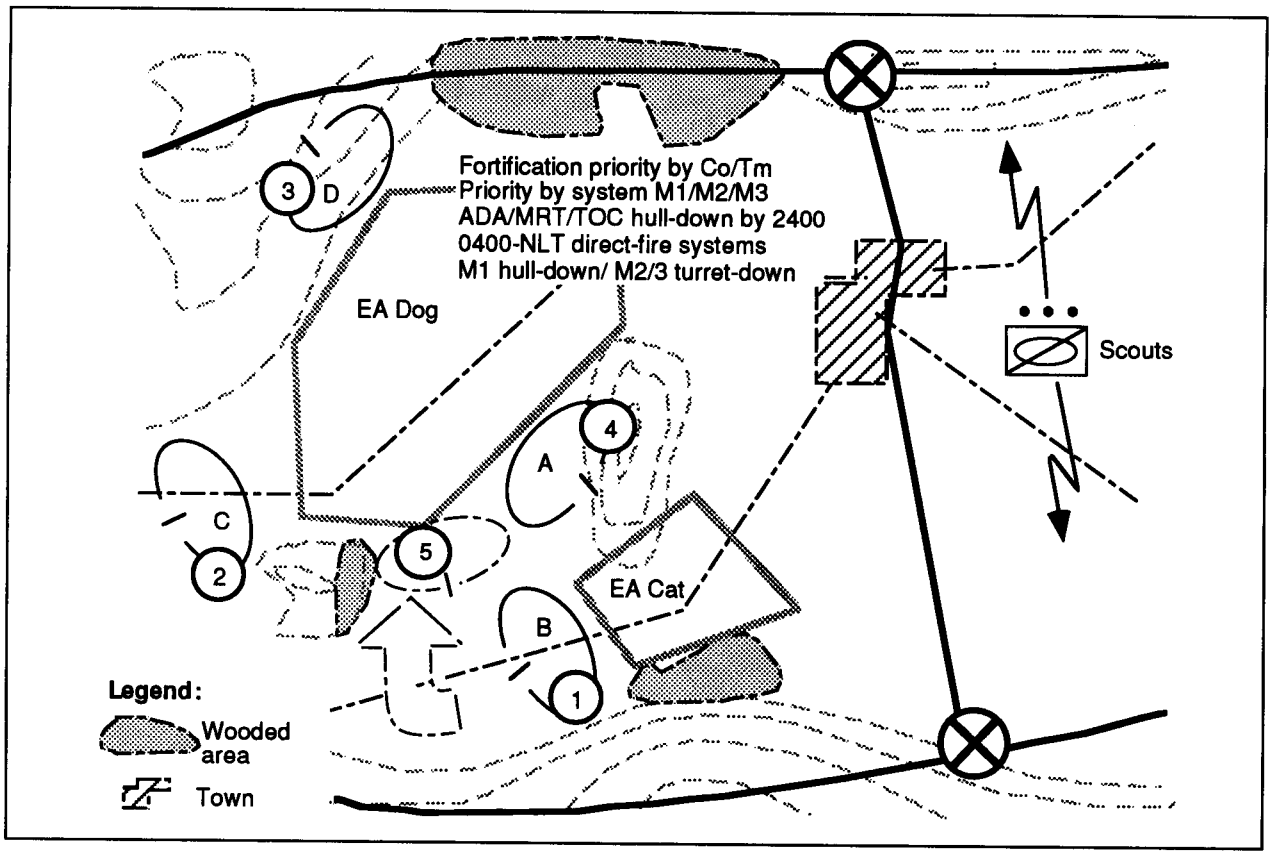

Figure 4-7. Fortification plan

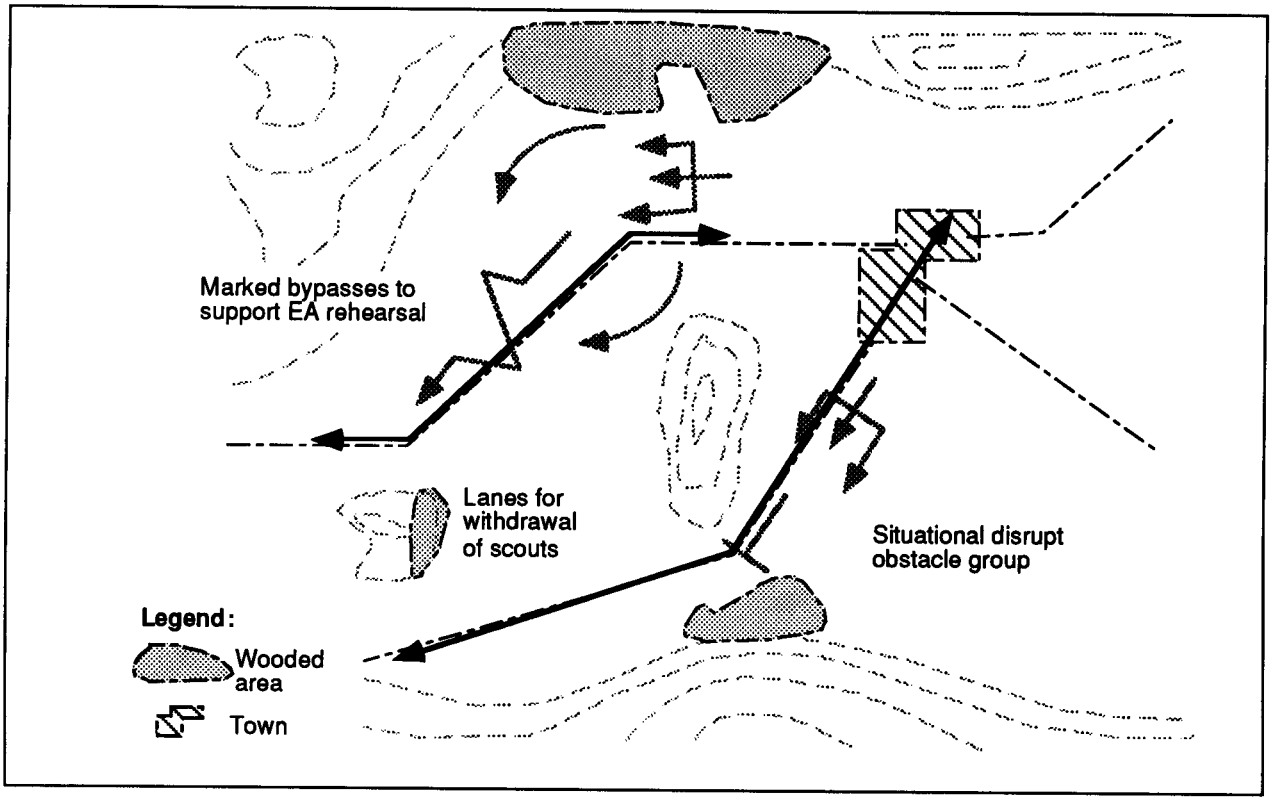

Figure 4-8. Obstacle-plan refinement

PLANNING BELOW TASK-FORCE LEVEL

The following sections outline the principles for siting tactical obstacles and fighting positions to support the company/team. The focal point is the coordination that must occur between the emplacing unit leader (normally an engineer platoon leader) and the company/team commander. This coordination is probably the most vital component of effective obstacle and fortification integration. It is at this level that units directly integrate obstacles and fortifications with the effects and capabilities of weapons and the fire plan. Once the coordination is complete, the emplacing unit physically sites the obstacle and fighting positions with the company/team.

COORDINATING WITH THE MANEUVER COMMANDER

Effective coordination with the company/team commander, who is responsible for the obstacle group, is essential to making the obstacles a combat multiplier. The emplacing engineer is the company/team commander's "team engineer" for the mission. The engineer and the company/team commander work closely to ensure complete integration of obstacles with the company/team plan.

The emplacing engineer and company/team commander use a common set of information when coordinating. The following tools and information will improve coordination:

- The SITEMP.
- The commander's intent, including the unit's task and purpose.
- Maneuver graphics and the fire plan.
- The obstacle-execution matrix.
- The scheme-of-obstacle overlay.
- The fire-support plan.
- CSS graphics.

During coordination, a checklist is used for organizing thoughts and formulating questions. Table 4-2, page 4-16, provides a checklist of some of the considerations used during coordination between the emplacing engineer and the company/team commander. These considerations are organized using the BOSs to provide a logical framework.

SITING THE OBSTACLE

The emplacing engineer and the company/team commander site individual obstacles to achieve synchronization between the obstacle effect and fires. Both must devote sufficient time to the siting effort. It represents the final adjustments to both obstacle location and fire control before emplacement.

To site individual obstacles, certain preconditions are necessary. First, the company/team commander decides where he plans to mass fires and marks the necessary fire-control measures on the ground. The location of these control measures must be clear since they are the basis for obstacle siting. Second, the commander identifies tentative locations for his key weapons within his position or sector. Finally, he and the engineer must both understand the obstacle group's intent.

Obstacle siting concentrates on marking the obstacle group as a whole instead of marking each individual obstacle. However, it may be easier to site individual obstacles in broken terrain. The company/team commander and emplacing engineer use vehicles or soldiers from the company/team, the engineer platoon, or both to simulate the enemy force and do the physical marking. The simulated

Table 4-2. Obstacle coordination checklist

BOS	Considerations
Intelligence	• Enemy AAs and MCs (mounted and dismounted) • Likely enemy COAs and possible reactions to obstacles • Enemy breaching capability • Enemy reconnaissance routes, friendly counterreconnaissance or R&S plans, company/team-level patrols • Likely enemy formations and transitions between formations
Maneuver	• Higher commander's intent • Type of weapons and locations • Sectors of fire/location of TRPs and how they are identified • Mobility requirements for adjacent units, CATK axis, routes for repositioning, employment of reserves, and passage of lines • Obstacle-protection measures
M/S	• Obstacle intents (target, location, and obstacle effect) • Integration of obstacles and fires • Obstacle-control measures and restrictions from higher HQ • Obstacle marking to prevent fratricide • TF mobility requirements (lanes and gaps) • Mutual support between the obstacle location, the fire plan, obstacle effects, and survivability positions
Fire support	• Artillery or mortar targets • Priority targets, what type, and final protective fires • Plan for covering obstacle effects with indirect fires • Indirect-fire-control measures to synchronize direct and indirect fires and obstacles • Fire-registration plan (deconflict with obstacle emplacement) • Fire support if enemy contact occurs during emplacement • ADAM/RAAMS use (lane closure and repair breached obstacles)
Air defense	• Location of the enemy air AAs during emplacement • Update on changes to air-defense warning and weapons-control status • Location of air-defense systems that can cover engineers emplacing obstacles • Method of obtaining and disseminating early air-defense warning
CSS	• Tentative location of the Class IV/V supply point within the company/team position, if used, and routes from the supply point to obstacles • Routes the company/team plans to use to conduct LOGPAC operations • Manpower assistance and material-handling equipment at the Class IV/V supply point
C^2	• Location of commander during defensive preparation • FM net of the supported company/team and means of communication • Unit boundaries affecting obstacle emplacement • Time and place of company/team order • Coordination that must occur with adjacent units • Obstacle reporting and recording requirements • Time and method of obstacle turnover • Lane-closure responsibilities and procedures • Company/team understands obstacle intent

enemy forces move into the EA to the enemy side of the obstacle group. The engineer platoon leader and the company/team commander collocate near the weapons covering the obstacle. As a technique, one or all of the tanks, Bradleys, or other crew-served weapons may occupy their position and contribute to the siting process, All participants in the siting process use a common frequency-modulated (FM) net to communicate during siting.

The simulated enemy forces move into the EA, simulating the enemy's attack. They deploy into a formation of similar frontage as the expected enemy formation. Once they are near the marked fire-control measures, they place markers at intervals as they drive the trace of the obstacle-group effect (or individual obstacles in broken terrain). They remain oriented on key fire-control measures to ensure that obstacle location and effect are synchronized with fires. During the process, each participant verifies that he can cover the obstacle, notes the location of fire-control measures and obstacles, and records the appropriate data on range cards. As the platoon drives the obstacle trace, siting participants also identify dead space and requirements to refine the location of obstacle group and fire-control measures. The siting process may also identify the need for other fire-control measures. Figure 4-9 illustrates how the engineer and the company/team commander work together to site a turn obstacle group.

Once the company/team marks the general limits and orientation of the obstacle group, the engineers can begin marking individual obstacles (if not already done). To mark individual obstacles, the engineer platoon uses the group markers as a guide. As shown in Figure 4-9, the group markers may lend themselves well as the start and end points of individual obstacles; however, this is not always the case. As the engineer platoon refines the group limits into the site of individual obstacles, the platoon can then begin the necessary site layout based on the method of obstacle emplacement.

Siting is not the last thing done during preparations. The time and resources involved in emplacing tactical obstacles require that siting begin concurrently with establishing the defensive position. It is imperative that the unit sites the obstacles as soon as the

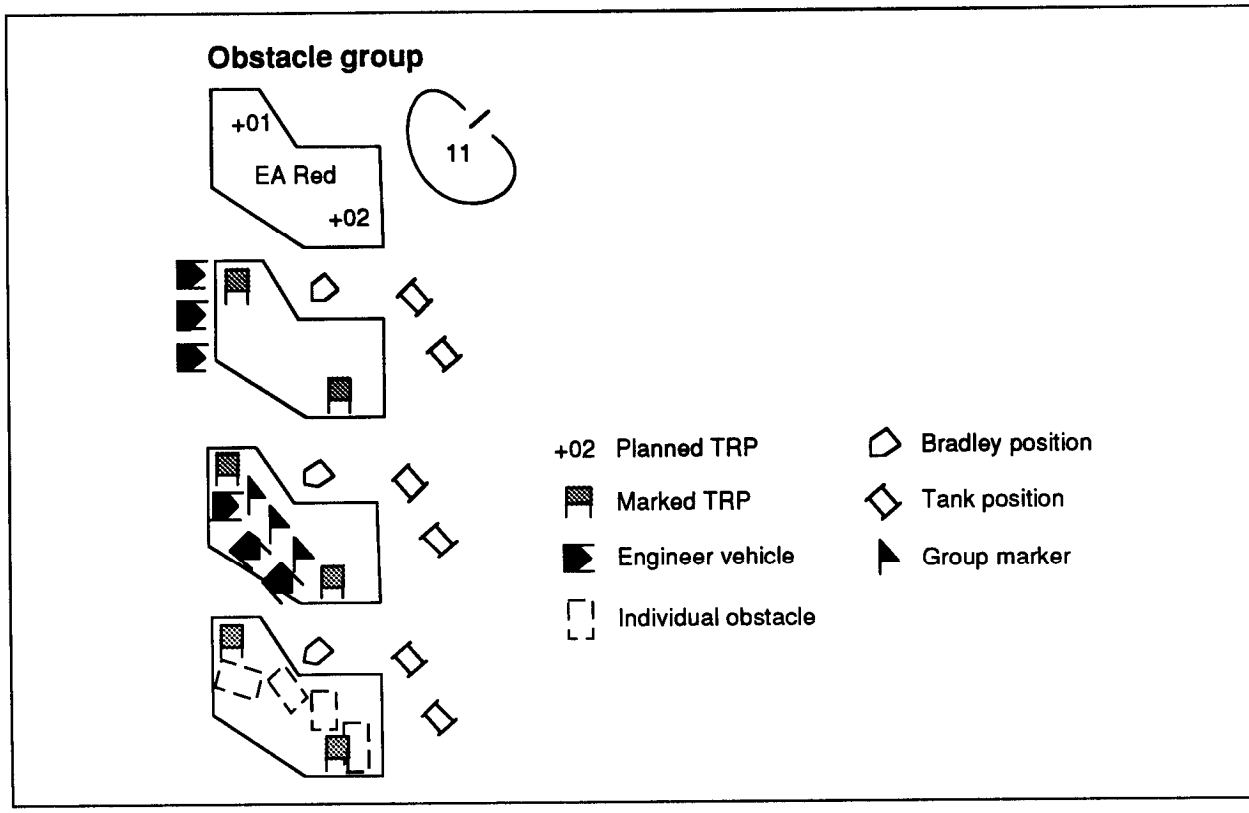

Figure 4-9. Sample obstacle-siting turn-obstacle group

company/team commander has established the EA and identified tentative positions for key weapons. It is not necessary that all weapons are in place and dug in before siting. Normally, well-marked fire-control measures and one known position per maneuver platoon (not dug in) is all that is required to effectively site the obstacles.

OBSTACLE TURNOVER AND TRANSFER

Once an obstacle group is completed, the emplacing unit conducts obstacle turnover with the owning unit. Occasionally, an owning unit will transfer responsibility for an obstacle to another unit. Obstacle turnover or transfer ensures that the commander of the owning unit is familiar with the obstacle and understands his responsibilities concerning the obstacle. The following are some considerations for obstacle turnover and transfer:

- Briefing on local friendly and enemy situation.
- Description of the obstacle, including location, type, marking, and composition.
  - — Conventional minefields: types of mines, fuzing, and AHDs.
  - — Scatterable minefields: types of mines, duration./self-destruct time, and safety zone.
  - — Other obstacles (booby traps and other hazards).
- Information on lanes, including number, locations, marking, and closure plan, or information on the reserve obstacle (if applicable).
- Coordination completed or still required with the fire-support team.
- Transfer of graphics and documentation (minefield records, demolition target folders, orders for the demolition guard, or other written records).
- Guidance on obstacle-protection measures taken or required (counterreconnaissance, targeting enemy breathers, obstacle repair, or phony obstacles).

More detailed information on obstacle turnover can be found in FM 20-32.

SURVIVABILITY PLANNING

The A&O platoon leader must coordinate with the company/team commander in a similar fashion as his line-platoon counterpart. The company/team must first position his direct-fire systems before the A&O platoon leader can direct his equipment to begin construction. Caution must be exercised to prevent this construction process from starting before the systems have been sited in. If the systems have not been positioned, there is a risk that the construction effort will not be in the proper place, wasting valuable time and effort.

After the A&O platoon leader understands where the company/team will place their systems, he can direct his equipment to start work. The A&O platoon leader must monitor the construction effort and keep the engineer informed of his progress. This information is critical for the staff to monitor defensive preparation and will allow them to make informed recommendations to the commander if changes in priority are required.

The A&O platoon leader, maneuver platoon leaders, and combat/section leaders must ensure that the direct-fire systems can see the EA, TRPs, and obstacles once the positions are completed as shown in Figure 4-10. They should immediately inform the company/team commander if they discover a potential problem with this. The A&O

platoon leader also helps to ensure that the quality control of the position's construction is monitored with the company/team leadership. It is a joint responsibility between the builder and occupier of the position to ensure the following:

- That the position is properly positioned.
- That the position is of the proper depth, width, type, and length.
- That is the spoil is removed or camouflaged.
- That the position is test-fitted by the direct-fire system.

The TF plan should seek ways to increase the force's survivability without delaying the construction effort for the companies/teams. The TF engineer should attempt to get ACES forward during the leader's reconnaissance to link up with maneuver commanders at their battle positions. If not,possible, one technique is to concentrate on indirect-fire systems (TF mortar platoon and fire-support team vehicle (FIST-V)), ADA systems, C^2 facilities, or CSS facilities while 'the companies/teams continue to site their direct-fire systems within the framework of the TF's direct-fire plan. This technique will maximize the survivability effort without sacrificing time allocated to the direct-fire positions.

The A&O platoon leader should use equipment teams where possible. This maximizes equipment usage while minimizing C^2. He should mass his equipment for the same

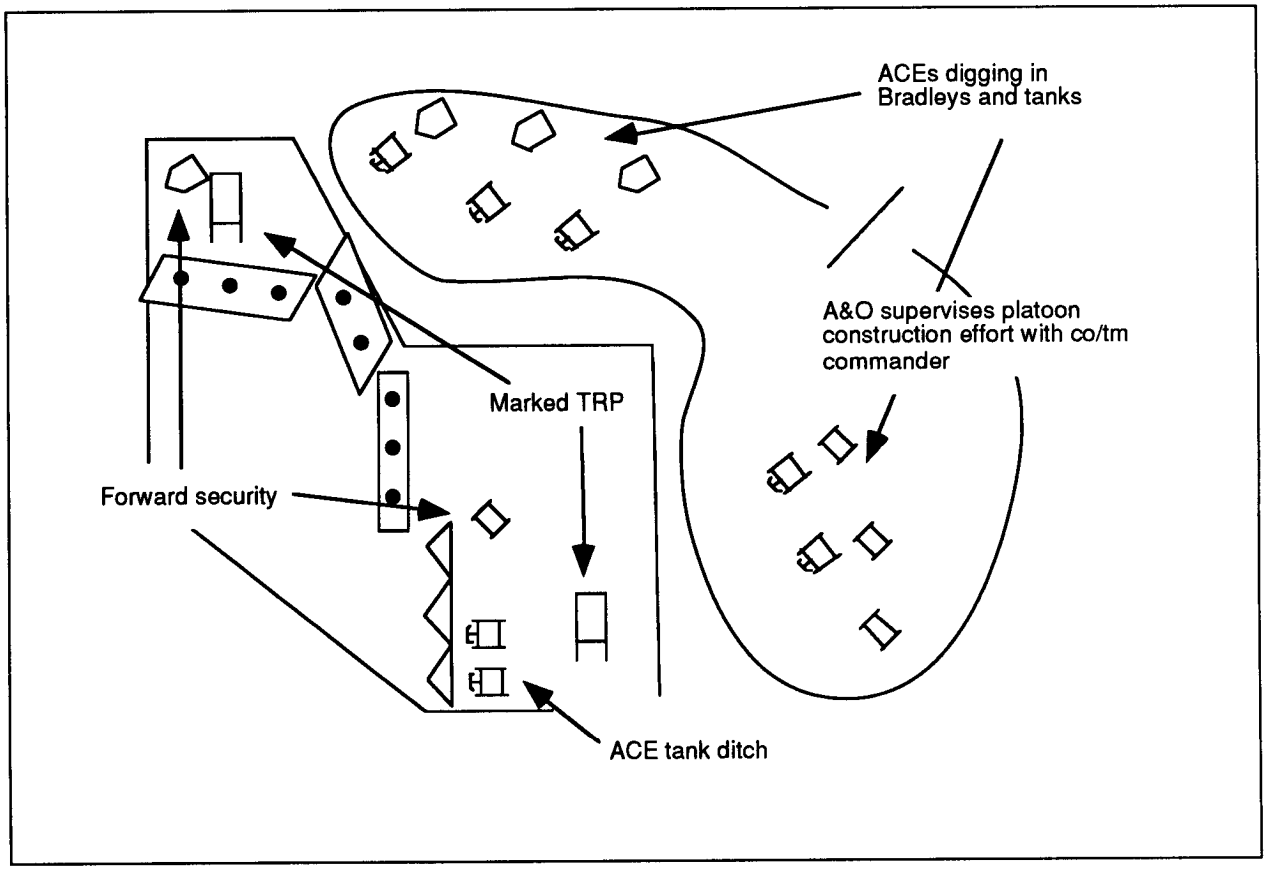

Figure 4-10. A&O platoon coordination with a company/team

reasons. Also, ACE-equipped units can construct hasty fighting positions quickly using ACE teams. These can be upgraded later with bulldozers or, if additional time is available, with extra ACEs. Like the heavy equipment, the A&O platoon leader should mass his small emplacement excavators (SEEs) to dig in critical dismounted fighting positions.

In many situations, the A&O platoon leader and the engineer and company/team commanders will be able to optimize existing terrain features with a small amount of earth moving. Existing folds in terrain, wadis, or ditches can be easily and effectively turned into fighting positions with limited equipment use.