Planning Engineer Support for a MOUT Attack

By Captain John C. DeJarnette

Today's soldiers must be prepared to fight on increasingly diverse terrain, including terrain containing manmade features found in urban areas. These elements are viewed as obstacles of maneuver. Military operations on urbanized terrain (MOUT) encompass all military actions planned and conducted on a terrain complex where manmade construction impacts on the tactical options available to a commander.

This article provides considerations for engineer planners and leaders to employ when battalions and brigades seize built-up areas. It is intended to amplify current doctrine outlined in FM 90-10-1, *An Infantryman's Guide to Combat in Built-Up Areas* (with change 1). Lessons learned are drawn from observing attacks on the Shugart-Gordon MOUT training facility at the Joint Readiness Training Center.

Mission Analysis

Mission analysis sets the conditions for planning and ultimate success of MOUT operations. Engineer planners must identify specified, implied, and essential tasks as well as constraints and limitations. Well-prepared engineer battlefield assessments (EBA) and terrain analysis products are essential. Answering the following questions will help engineer planners develop an effective MOUT offensive mission analysis.

- **Where is the key/decisive terrain?** Identify this terrain for the approach march and for seizing buildings. Conduct a line-of-sight analysis along the route and compare it to the enemy template.
- **Where are the best reduction sites and support-by-fire positions for securing a foothold?** Consider the terrain, the enemy force template, and massing fires. Determine the minimum engineer force required to seize a foothold, seize essential facilities, and provide mobility support to mounted forces, such as how to sequence engineer tasks and change the engineer task organization to accomplish essential tasks. Identify the key leaders required to facilitate command and control of critical events and task organization changes.
- **How should subordinate units execute in-stride versus deliberate breaching operations based on the enemy template and results of reconnaissance and surveillance (R&S) efforts?** Decide where to use the mine-clearing line charge (MICLIC), tank-mounted countermine equipment, and manual breach techniques. Balance exposure of the breach force to enemy fires with the probability that a system may be killed before it can be employed.
- **How will reconnaissance forces link up, guide, or mark obstacles for bypass/breaching operations?**
- **What are the counterattack routes of the enemy force?** Consider the terrain and weather. Determine if enemy counterattack routes can be used to move friendly combat service support assets based on the enemy event template and time phasing of the counterattack. Determine what situational obstacles (rapid mining, scatterable mining) the enemy counterattack force has available.
- **What is the safety zone and trigger for using scatterable mines?** Ensure that this information is disseminated at all rehearsals.
- **What is the composition of the buildings to be attacked?** Determine the effects weapons will have on these structures (this drives the selection of fuze/shell combinations and aircraft attack munitions).
- **What is the "layout" of the town both above and below ground?** Determine the protected areas, such as churches, hospitals, and museums. Sources for this information are imagery from the division, gun camera tapes from OH-58/AH-64 helicopters, Michelin road maps, and tour books.

Support Products

The engineer staff planner helps when the following products are developed to support the military decision-making process (MDMP) after the initial warning order is received. These products are updated based on the results of reconnaissance and surveillance.

Engineer Battlefield Assessment

The EBA feeds many of the subsequent products. Clearly articulate the enemy engineer capability based on the most likely and most dangerous courses of action. Consider past experience with this enemy, his current strength, anticipated barrier material basic loads, expected resupply rates, and locally available materials the enemy can use to prepare his defense. This information will support development of the situation template (SITEMP).

Identify friendly engineer capabilities for mobility, countermobility, and survivability operations. Explicitly state the number and types of breaches each engineer unit is capable of executing based on its personnel, equipment, and logistical status. Leader proficiency and audacity impact on this estimate, so plan two levels down, based on the unit. Use this information to develop the task organization later in the MDMP.

Estimate the impact of terrain and weather on both friendly and enemy capabilities. Line-of-sight, hydrology, cross-country movement, and line-of-communication overlays are helpful and can be provided by the division terrain detachment or quickly approximated from maps.

SITEMP

Know the enemy capability based on an estimated unit basic load of Classes IV and V materials and anticipated resupply. The time available to prepare the defense is essential. Reconnaissance assets should observe the delivery and emplacement of barrier materials. Template enemy obstacles and counterattack routes based on terrain and weather conditions. Determine what resources are available in the MOUT area (ammonium nitrate, acetylene, propane, lumber yards, jersey barriers, vehicles, and construction equipment) that can contribute to his defensive preparation.

Based on this analysis, the engineer and S2 jointly template the enemy engineer countermobility/survivability capability on the SITEMP. It should include minefields, tactical and protective wire obstacles, and vehicles and other barriers in roads. This overlay is used to plan the engineer task organization, because this and the friendly scheme of maneuver determine the number of sapper squads needed and where mobility assets are placed in the order of movement.

Time and materials will impact his defensive capability. The force array in the security zone and main defensive belt impacts the amount of defensive preparation. Indirect-fire systems can only service one priority target and must shift to cover other targets, which may help in adjusting the obstacle template. Locations and movement of mounted weapons may indicate usable lanes for our infiltration of vehicles.

Event Template

Determine what triggers the commitment of enemy counterattack forces. Determine what situational obstacle capabilities he has, where and for what purpose the capabilities will be committed, and what the triggers are. Determine the structures likely to be set for destruction (such as petroleum and natural gas storage facilities).

Friendly Forces Survivability Time Line

Construct positions to support the forward displacment of combat support and combat service support assets and limited command and control nodes. The survivability effort should be an essential part of the maneuver deception plan.

Breach Execution Matrix

This matrix helps task force engineers allocate assets and determine when in-stride and deliberate breach techniques are required. Specify where to use the MICLIC, hand-emplaced explosives, armored combat earthmover (ACE), armored vehicle-launched bridge (AVLB), and tank-mounted countermine equipment.

Decision Support Template/Decision Support Matrix

Help the S3 identify and plan branches and sequels to the plan. It is essential to know where engineers will culminate and how rapidly platoons can be consolidated, reorganized, and put back into the fight.

Execution Checklist/Operations Schedule

Develop with the S3 the operations schedule (OPSKED), which is a combination of key events from the synchronization matrix and associated code words. This product supports the decision support template and helps the battle captain and maneuver commander track the battle and make decisions. Prepare a rough execution checklist after receiving the warning order and continue to refine it during mission analysis. Finalize the checklist during wargaming and provide "bootleg" copies to task force engineers and squad leaders (see page 11).

Troop-Leading Procedures Time Line

Ensure that adequate time is available to prepare the rehearsal site and that rehearsals are directed and supervised by key leaders.

R&S Planning Considerations

Integrate engineer reconnaissance teams into the brigade R&S plan. Focus these teams on engineer targets such as landing zone denial, obstacles in the reduction area, enemy survivability on the objective, and obstacles on approach routes into the objective area. The named areas of interest (NAIs) assigned to engineers should have priority intelligence requirements (PIR) that determine the best reduction sites into the city and confirm or deny enemy fortification of key sites.

Precombat Inspections (PCIs)

After conducting precombat checks (PCCs), inspect materials used to mark obstacle bypass lanes. Conduct FM and HF radio communications exercises using the OPSKED and reports specific to the current operation. Inspect all maps for operations security considerations. Sterile maps are not required, but information provided on overlays should not compromise the attack plan. Overlays should portray only NAIs. Targets, pickup and landing zones, and link-up locations should not be on overlays taken into the objective area. All soldiers must clearly understand the NAI priority and associated PIR, casualty evacuation (CASEVAC) plan, abort criteria, compromise plan, exfiltration and link-up plan, and communications windows.

Mobility Planning Considerations

Providing mobility support to a maneuver force in a MOUT environment normally will require engineers to support multiple combined arms breaching operations. The reverse planning process discussed in FM 90-13-1, *Combined Arms Breaching Operations,* applies to all terrain situations. The following considerations complement this process:

Conduct Approach March

Plan a primary route and an alternate route to support the movement of each maneuver battalion's combat forces. Clear these routes using standard tactics, techniques, and procedures (TTP). Control of movement routes is critical, particularly when ground evacuation is the primary method of removing casualties. Coordinate one-way, two-way, and alternating-direction traffic on routes with the brigade executive and operations officers. Identify decision criteria for switching to alternate routes. Maximize aerial reconnaissance of routes to identify possible obstacles, combat outposts, and ambushes.

Precombat Inspections. Conduct standard route-clearance PCCs and PCIs, which should be listed in the unit SOP. As a minimum check initiation systems, demolition charges, reduction equipment, marking materials, and mine detectors.

Rehearsals. Address all the breach tenets and explain the movement-control plan during each phase of the ground maneuver.

Secure the Foothold

Create lanes through obstacles using one sapper squad per lane, with a minimum of one lane per simultaneously assaulting platoon. (This does not mean nine lanes per infantry battalion. Analyze carefully.) Use adequate marking materials, guides for assault and follow-on forces, and lane hand-over procedures. It takes at least 30 minutes to "cycle" this squad back into the fight.

A squad cannot support breaching operations continuously. A decision point or trigger must support any changes in task organization and missions for engineers. Establish decision points for changing approach routes, reduction sites, and initiation of SOSR (suppress, obscure, secure, reduce).

Precombat Inspections. Equip the unit with bolt cutters (two per engineer squad), grapnels (three per engineer squad), a lane-marking kit, hand-emplaced explosives (10 per squad, per lane), mine detectors, and probes. Ensure that handheld smoke is available for each infantry soldier and that vehicles or utility helicopters carry smoke pots. Mass this smoke with the breach force at the objective rally point. Ballast load marking system upgrade materials on gun trucks. Use expedient reduction tools, such as Skidco litters, for wire reduction.

Rehearsals. No matter what rehearsal type or technique is used, perform basic SOSR rehearsals (see FM 101-5, *Staff Organization and Operation,* Appendix 6, for more information on rehearsals).

Suppress. Ensure that all personnel understand the location of support-by-fire positions and the pyrotechnic and radio signals to initiate obstacle reduction and indicate when the lanes are open (proofed and marked). The rehearsal site should have a full-scale lane-marking system visible to every soldier. All key leaders should understand the commitment criteria for the breach force.

Obscure. Rehearse triggers for artillery delivered, hand-emplaced, and vehicle-generated smoke. Consider the position of the moon relative to the support-by-fire position, the percent of illumination, and the night-vision goggle window.

Secure. Hold a combined arms rehearsal of the breach force using the full-dress technique. This rehearsal includes engineers and attached maneuver elements dedicated to suppressing direct fires and destroying local counterattacks.

Reduce. The combined arms rehearsal should include handing over lanes from engineers to maneuver soldiers. The rehearsal should be "NCO to NCO" and discuss details of linkup and handover. Consider the need to back-haul casualties when planning the number of lanes.

Seize Key Facilities

Plan procedures for dynamic entries into buildings and vertical envelopment, which require prepared special demolition charges (see FM 90-10-1, change 1), expedient assault ladders, and climbing grapnels. Rehearse the TTP for getting into windows on second and third floors. Have cutting tools available to prepare climbing poles at the objective rally point. Plan for subsurface entry. Consider the use of reducing wire in stairwells and hallways.

Precombat Inspections. Inspect special breaching charges (see FM 90-10-1, with change 1). Ensure that charges are properly constructed and that they will "stick" when placed. Use double-sided foam tape when placing vertical breaching charges during warm, dry conditions. Use spikes, braces, or Ramset-type power-actuated fasteners during rain or when temperatures are below freezing. Ensure that sufficient handheld and hand-emplaced smoke is available. Maneuver soldiers can carry smoke pots and additional explosives. Where practical, use battering rams (picket pounders or equipment found in MOUT areas) to enter doors. Conserve explosives by bringing one or two 24-inch crowbars to lift manhole covers and pry open entryways in buildings and sewers. Provide night-vision goggles to soldiers who reduce obstacles, because infantry leaders use infrared "tactical pointers" extensively, and reduction element soldiers must be able to see these signals. Use all available infrared lights. Mount and zero all AN/PAQ-4s and

AN/PVS-4s during the preparation phase of the mission. Engineers must bring handheld infrared light sources (such as Phantom lights or infrared filters on Maglites) and visible light sources (D-cell Maglites or SureFire TAC Lights) to help move and reduce obstacles inside buildings and subsurface structures. Ambient light inside hallways and underground is virtually zero, so plan for additional light sources. Mark cleared buildings so the marking is visible from rotary-wing aircraft and armored vehicles and by dismounted soldiers.

Rehearsals. Focus on the location and control of support forces and signals for commiting the breach force. Ensure that soldiers understand the minimum safe distance and the best reduction site based on the building structure. Clearly identify routes between buildings and the marking method for "safe routes." Deconflict building clearance markings from collection points for casualties, displaced civilians, and enemy prisoners of war. Rehearse close quarters combat drills for interior building clearing. Basic SOSR rehearsals from "secure the foothold" apply to dynamic entry into buildings, but these rehearsals usually focus on the infantry platoon and an engineer squad.

Civilians on the Battlefield/Enemy Prisoners of War. Establish "protected areas" for civilians on the battlefield, and clearly mark routes for displaced civilians. Consider an expedient countermobility effort to restrict access to these civilians and enemy prisoners of war. Liaison officers from psychological operations, civil affairs, and the military police should address this topic in the brigade maneuver rehearsal. Although there are no specific engineer requirements, be prepared to provide technical assistance during planning and execution phases.

Subsurface Fight. This is a variation on the theme of clearing buildings. Salient points are: entering the tunnel or sewer complex using hand tools or explosives, identifying and neutralizing mines and booby traps, and marking cleared areas. Navigation inside sewers and radio communications from inside the tunnel to aboveground soldiers is challenging. There is no ambient light inside tunnels, so plan and rehearse using infrared and visible light signals.

Move Within the City

Plan one vehicle lane per mounted platoon entering each section of the city. The lane through tactical and perimeter protective obstacles will become an "axis" for movement within the MOUT area. These lanes initially will support one-way traffic. Plan and rehearse traffic control as lanes become alternating traffic lanes to allow for CASEVAC. Improve at least one lane to two-way traffic and designate this as the primary CASEVAC route. Designate, clear, and mark a route from the casualty collection point to the CASEVAC primary and alternate helicopter landing zones. Use combat route-clearance techniques to clear the ground CASEVAC route. Reduce or bypass obstacles created by "junk vehicles," CONEXs, rubble, etc. If bypassing is part of the plan, make it a branch to the plan and include associated decision points and conditions.

Precombat Inspections. Inspect MICLIC and tank-mounted CME. Ensure that designated dismounted sappers have at least 20 blocks of TNT or C4 and 500 feet of detonating cord to reduce a 100-meter deep "lane" for vehicles. Inspect mine detectors carried by engineers designated to execute this mission. Sandbag one vehicle to use for proofing vehicle lanes, and dismount all passengers when proofing the lane. Ballast load additional lane marking material on vehicles. To assist the maneuver force in locating the correct lane to support their tactical plan, ensure that markings for multiple lanes are easily distinguished by day and at night. CASEVAC lanes must have a dedicated traffic control post (TCP). One technique is for this post to be initially manned by representatives from the medical platoon of the lead task force. Integrate a tank-mounted plow or properly prepared heavy vehicle (dozer, loader, or 5-ton truck with winch) into the plan to reduce rubble or junk vehicle obstacles.

Rehearsals. A combined arms breaching rehearsal is required according to FM 90-13-1. This rehearsal will serve as the final check for mission-essential equipment and final adjustments to the plan based on PCIs. Synchronize the establishment of support-by-fire positions to isolate reduction sites and trigger conditions for initiating reduction operations (the conditions and who makes the decision). Determine who shifts obscuration and suppressive fires and when they are shifted. Key leaders must rehearse handing over lanes to follow-on forces. Rehearse time-phasing the ground CASEVAC route clearance to helicopter landing zones and ambulance exchange points. Construct the unit's standard lane-marking system and route signs at the rehearsal site.

Countermobility Planning Considerations

Address these issues in the brigade-, battalion-, and company-level rehearsals. Plan to issue a scatterable mine warning (SCATMINWARN) to prevent fratricide.

Tactical Employment of Scatterable Mines

Plan in detail the employment of artillery-delivered antipersonnel mines/remote antiarmor mines (ADAM/RAAM) and multiple-delivery mine systems (Volcanos). Specify the target to be attacked, a tentative location, its effect (disrupt, turn, fix, or block), the delivery system, the observer, and the trigger.

Protective Employment of Scatterable Mines

Ballast load the Modular Pack Mine System (MOPMS) on vehicles moving into objective area blocking positions.

Engineer Staff Planning Checklist (Brigade and Below)

Plan

General

- ❒ Identify and resource all mobility/survivability essential tasks.
- ❒ Address all the breach tenets during planning and rehearsals.
- ❒ Request terrain products, MOUT layout diagrams, and data on building composition from higher headquarters.
- ❒ Study available terrain products to determine which subsurface routes to use and how to defend against enemy use of these systems.
- ❒ Study available maps and photos to determine the best routes to use when approaching the city and within the city. Determine where to establish casualty collection points, aid stations, and ammunition and water resupply points.
- ❒ Use scatterable mines to support engagement areas that block mounted counterattack routes. Disseminate this plan to critical maneuver and combat service support leaders.
- ❒ Establish essential engineer friendly forces' information requirements and no-later-than report times.
- ❒ Nominate engineer-specific PIR and associated NAIs to support the reconnaissance plan. Ensure that the latest time information is of value (LTIOV) is clearly understood. Decide what actions to take if the PIR are not answered before LTIOV.
- ❒ Disseminate the enemy obstacle template to all engineer leaders.
- ❒ Task organize engineers to support essential mobility/survivability reconnaissance missions.
- ❒ Determine how much and what types of obscuration smoke are available. Determine the wind direction and speed, which will impact the effects of smoke. Coordinate with the fire support officer for recommended uses of white phosphorus (both mortar and artillery delivered) and handheld smoke. Coordinate with the smoke platoon leader for duration of smoke and level of obscuration.
- ❒ Designate and clear routes for mounted forces and reserve forces.
- ❒ Identify the "conditions" and a decision point for initiating deliberate breaching operations during each critical event of the operation.

Approach March

- ❒ Designate routes for ground convoys and allocate engineers to clear them.
- ❒ Determine the clearance method and acceptable risk.
- ❒ Ensure that all vehicles have lane- and bypass-marking materials on board.
- ❒ Designate ground CASEVAC routes.
- ❒ Determine the decision point for using alternate routes.
- ❒ Determine when to establish TCPs/guides at critical obstacles on the route.
- ❒ Establish NAIs along the ground route to confirm or deny the enemy obstacle template.

Secure the Foothold

- ❒ Designate the best reduction site and technique based on enemy force array, terrain, and trafficability.
- ❒ Nominate NAIs for breaching operations.
- ❒ Designate one lane for each simultaneously assaulting platoon and the engineers needed to reduce it.
- ❒ Explain the lane-marking system.
- ❒ Establish a traffic-control plan for dismounted and mounted traffic.
- ❒ Establish a vehicle route and a dismounted route from the foothold to the CASEVAC helicopter landing zone.
- ❒ Designate locations for blocking positions to keep counterattacks from interfering with breaching operations. Resource blocking positions with MOPMS, conventional mines, and expedient barrier capability (such as abatis). Depict the planned locations of scatterable mines (include the safety zone) on maneuver and combat service support graphics to reduce fratricide.

Seize Key Facilities

- ❒ Designate buildings to enter and a reduction site that will support maneuver to the point of penetration.
- ❒ Designate where the support force will enter buildings.
- ❒ Resource battalions and their engineers with sufficient explosives and hand-emplaced and artillery smoke.
- ❒ Explain the cleared-building and cleared-lane marking systems.

Prepare/Execute

- ❒ Construct appropriate rehearsal sites to support maneuver and combat service support operations.
- ❒ Provide enough detail in the troop-leading procedure time line to encourage both engineer and combined arms rehearsals.
- ❒ Issue sketch maps and terrain products to engineers.
- ❒ Construct a lane-marking system and bypass-marking system that all vehicle drivers must go through en route to the objective area.
- ❒ Provide enough detail in the maneuver and engineer execution checklists to effectively use the Decision Support Matrix.
- ❒ Specify times for engineer-specific precombat inspections conducted by platoon leaders, company commanders, and first sergeants.

Consider sling loading the MOPMS, conventional mines, and limited barrier materials to support transitioning to the defense and blocking enemy counterattacks.

Engagement Area Development

Specify the engagement area to interdict the enemy counterattack force. Ensure that battalion and brigade reserve forces have specified routes to move to the engagement area. Engineers may not be available to emplace obstacles, so specify the engagement area development tasks, including obstacle emplacement and fire integration, to maneuver units.

Survivability Planning Considerations

Perform this work concurrently with initial reconnaissance and "condition setting" by the brigade to support the brigade and division deception plans.

Field Artillery. Determine positioning areas and plan counterfire radars and ammunition stocks.

Forward Area Refuel Point. Establish locations for stocking fuel and ammunition. Plan for multiple refueling sites to support the attack and lift aviation simultaneously.

Advance Trauma Lifesaving Sites. Locate forward treatment facilities and ingress/egress routes. The implied task is to establish helicopter landing zones for these sites.

Summary

While the process for planning engineer support to a MOUT attack follows existing decision-making steps, engineer planners must understand how this diverse terrain impacts engineer operations. Critical points include:

- Structures become key terrain.
- Belowground and multilayered aboveground dimensions are added.
- Terrain enhances the enemy's countermobility and survivability efforts and increases the friendly force's mobility requirements.
- Decentralized execution—while staying collectively synchronized—is required.
- MOUT-specific precombat checks, precombat inspections, and rehearsals must be conducted.

By accounting for these impacts, engineer planners can make sound decisions to set the stage for effective engineer support to the maneuver force in this demanding environment.

Captain DeJarnette is an engineer observer/controller at the Joint Readiness Training Center, Fort Polk, Louisiana. He previously served with the 37th Engineer Battalion, Fort Bragg, North Carolina, and as commander, B Company, 11th Engineer Battalion, Fort Stewart, Georgia.



Several readers had questions regarding the article "The MARTEN: A Quantum Leap for Engineers" in the February 1998 issue (page 18). Some questioned the name MARTEN. The following information will clarify any misconceptions we may have unintentionally raised.

Using the TRADOC Concept Evaluation Program, the Engineer School obtained from Melroe Company a Model 763 skid steer in 1997 for evaluation. Their company logo reflects the face of a bobcat and their skid steers are called "Bobcats," a copyrighted name we could not use. The MARTEN is the author's name and is not official.

The article might also lead one to believe that the Army spent millions developing a system that is readily available as a commercial off-the-shelf (COTS) purchase. That is not so. The Engineer School leased the skid steer and all its attachments at a very favorable rate and has since returned it to the manufacturer.

The purpose of our evaluation was to quantify the increased performance afforded by a skid steer. The data and evaluation results are necessary for school personnel to create requirements documents, a process that eventually will result in fielding the skid steer to engineer and other units.

If readers focus on the name MARTEN versus Bobcat and not on how well the MARTEN performs, they completely miss the point. It's what the system brings to the engineer on the battlefield that is important. A system capable of increasing an engineer squad's productivity by 25 percent can be called anything you want, just have it available! If you've ever constructed a concertina fence by driving the pickets with a sledge hammer, I'll bet you'd rather have something (a MARTEN?) with a hydraulic picket-pounding attachment.

I encourage units that have utilized skid steers to submit after-action reports or comments to the Director of Combat Developments using the comment form on the Engineer School home page at http:\\www.wood.army.mil.

Alan Schlie
Force Development Analyst