

ENGINEER BASICS

Some Rules to Improve Mobility and Countermobility

by Captain Wayne Skill

The following compilation of lessons learned and observations from the National Training Center, the CMTC, and even Bosnia is intended for all of us involved in the combined arms fight. Although it is about mobility, countermobility, and survivability, this article is not just for engineers. If you've ever watched your combat power dwindle away at the breach site, or had your battle position overrun by the OPFOR, this article may be for you. Few of these techniques are original on my part, but rather are a collection of methods successfully executed on the ground.

Mobility

Mobility means maintaining freedom of maneuver and making sure we can get the force from one place to another on the battlefield. At the task force level, what we're really concerned with is finding a way around or through obstacles. Breaching is about as difficult an operation as we can execute at the task force level. At the NTC, we see most units struggle with breaching operations, particularly during force-on-force battles. Problems generally fall into four areas:

- **Plan.** Units fail to account for the five breaching tenets, including the breach fundamentals, during both course-of-action development and wargaming. Of the breach tenets, intelligence (OBSTINTEL) and synchronization prove to be the biggest problem areas. Engineers are not getting involved in the R&S planning process and are not coordinating to make sure PIR and resultant NAIs develop the information to get us to the objective. Finally, we often see the staff fail to effectively wargame the plan, including enemy reactions and realistic estimates of combat power losses at the breach site.

- **Order.** Orders tend to lack definition of the specific sub-unit tasks required to set the conditions to breach, or fail to define what "good" looks like in terms of the breach fundamentals. The orders gen-

erally do not define where smoke needs to go and what it must accomplish. Orders also fail to define what, or how much, the support force needs to kill on a particular enemy battle position in order to successfully suppress.

- **Preparation.** Units usually always conduct some form of rehearsal, but not full mounted rehearsals that include use of mine plows. As a result, units lose an opportunity to synchronize actions at the breach site.

- **Execution.** When units do have a good plan in place, we often see them fail to maintain tactical patience when setting the conditions to breach, and then, once they commit, they do not execute quickly and violently.

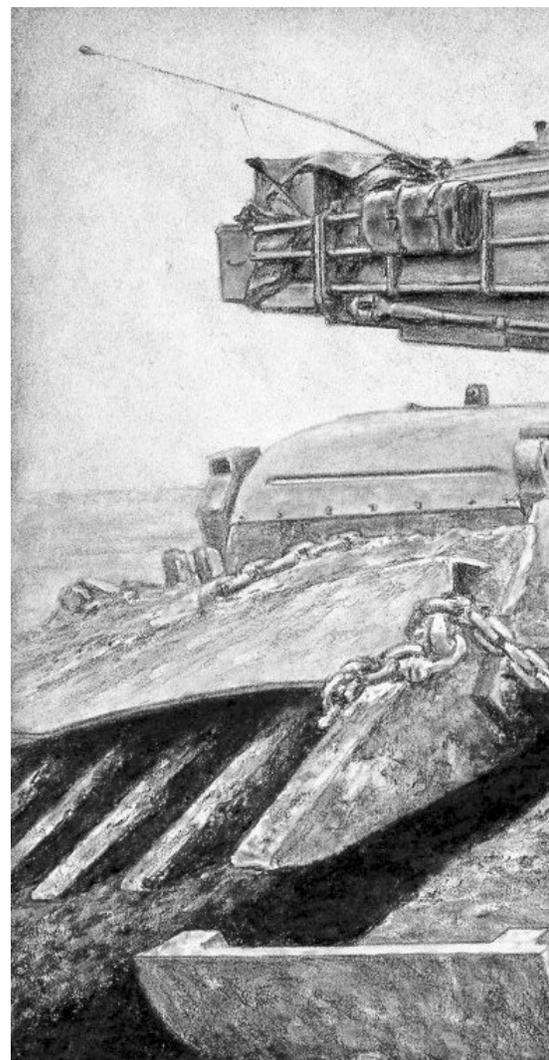
Here are some tips and lessons learned:

- **TerrabaseII.** If your unit doesn't have it, get it. It's free from the Engineer Center, or you can download it off the Web. Teach your TOC NCOs how to use the program and build your products for you. It's easy to learn and pays huge dividends as a tool to help you analyze the terrain, build the situational template, pick OP/RETRANS locations, or locate possible support by fire or battle positions. Terrabase allows you to quickly understand how intervisibility lines will affect the fight.

- **CFZ.** Activate a radar zone over both the proposed breach site, and the assault position where you plan to conduct final MICLIC preparation. This helps reduce the operational risk of excessive losses at the breach site due to OPFOR artillery.

- **ADA.** Coverage is a must over the breach site, particularly once the breach lanes are passing combat power forward, and over the assault position where we prepare the MICLICs.

- **Smoke.** Use obscuration, not just to obscure breach site but also to screen the movement of the support force into position. Without smoke to cover the move-

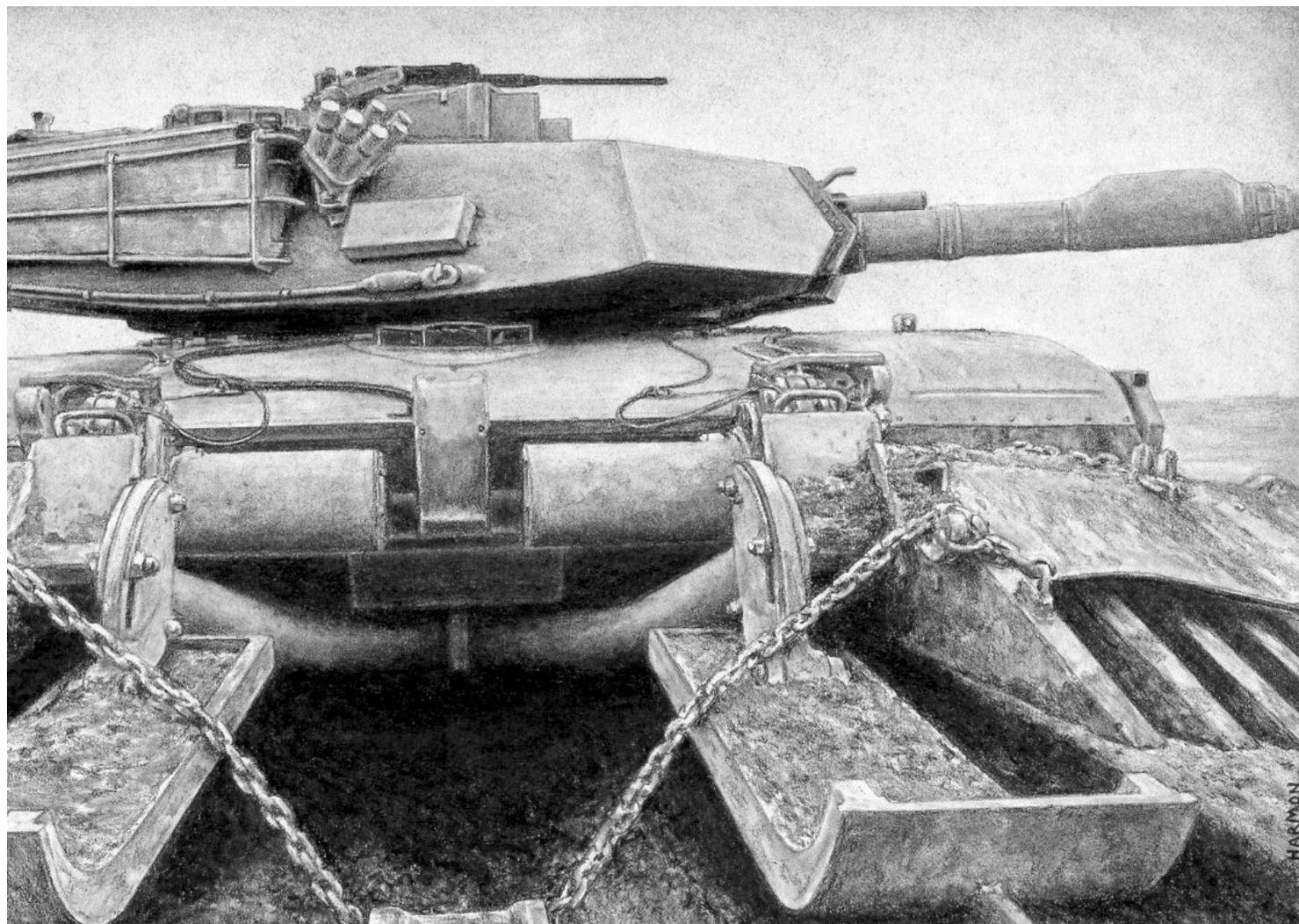


ment of the support force, you may not have a support force left to suppress the bad guys by the time you commit reduction assets. Consider infiltration of FISTs/ COLTs with scouts in order to get accurate indirect fires prior to the arrival of the support force.

- **More smoke.** The breach force needs smoke pots or smoke platoon support in order to execute the breach fundamentals, suppress, obscure, secure, reduce (SOSR), locally at the breach site. Remember to include smoke grenade launchers, and onboard smoke capabilities.

- **Lots of Smoke.** You can never have too much, even if it causes some confusion for friendly forces. Take advantage of our optics. The technology works in our favor.

- **Mortars** are not enough. It takes more smoke rounds than you can carry to get effective obscuration for a mechanized breach. Use additional methods if FA smoke is not available. Think about using



your mortars to suppress, while artillery fires your smoke.

Reverse Breach Planning. Analyze backwards from “actions on the objective” (in this case the breach lanes, including assault breach lanes) to derive breach force (and engineer) task organization. Analyze what it will take to open each lane, down to the individual vehicle and squad. Everybody is not entitled to a fair share of engineer or other reduction assets. Put them where they have to be in order to accomplish the mission. Use the same methodology to determine the composition of support and assault forces. Each of these represents a combined arms team.

Have a Plan. Saying we’re going to conduct a TF in-stride breach, handing the designated company/team some engineers, and pushing the planning responsibility down to company/team level is not adequate. That maneuver company still requires assistance from the TF to set conditions, and it will need other assets,

such as smoke, to successfully breach. You also have to define the criteria for transition to a deliberate breach and plan for that scenario as well. Determine exactly what criteria will trigger transition to a task force deliberate breach, and include it in the OPORD. Too often, planning at the task force level ceases when we identify a task force in-stride breach as our course of action.

Redundancy. If you think one MICLIC is enough to clear one lane, it means you need two. Use the same rationale for each individual vehicle, squad, and task in the reduction element (engineers, plows, and rollers) of the breach force. Include a redundant means of proofing each lane. This must be done in conjunction with the reverse breach planning process. Plan to lose half the reduction assets you commit to the breach. Use this factor in your wargame process.

Direct fire planning. Fire control measures are a must at the breach site, particularly for trailing units and the as-

sault force. A lack of control measures will result in killing your own. It’s happened. Consider a release line on the far side of the obstacle. The assault force remains in a weapons hold status until clear of this control measure. This prevents fratricide of the breach force occupying support by fire positions securing the exit to the breach lanes, or the engineer vehicles marking and proofing the lanes. Carefully plan the control measures and plan to lift or shift fires as the breach force moves forward to reduce a lane. Synchronize through mounted rehearsals.

Have a Plan. Even in a movement to contact mission, you need a plan to transition to a task force deliberate breach. You also have to have a plan at task force level for how you will execute a task force in-stride breach. An in-stride breach at task force level is not just that designated company/team’s problem, and your job is not done just because you’ve allocated them some engineer support. A task force in-stride breach is a deliberate

breach for the breaching maneuver company team. That maneuver company commander must have at his disposal all the tools to set the conditions to breach. That means he's got to have some additional help from the task force, to include smoke for obscurity, priority of fires for suppression, plows, dismounts for security, a plan to gather OBSTINTEL, and enough reduction assets to provide redundancy.

Breach fundamentals (SOSR). What does "good" look like? Define your criteria in the OPORD for commitment of reduction assets. Define who suppresses, from where, against what enemy formation, and how many enemy combat systems you need to kill on that position in order to set the conditions to breach. Use the same type of language to describe what the security element of your breach force is supposed to accomplish. Define the basics and mechanics of your obscuration plan. Define who calls for the smoke, who controls it, where it needs to be, and what effect it needs to have. Define all of this in terms of task and purpose in the sub-unit instructions of paragraph three of the OPORD.

Rehearsals. Conduct a mounted rehearsal at TF level. A mounted rehearsal is your most effective method to *synchronize* actions at the breach site. Your first attempt will prove why you need to do this. Plan time for multiple iterations. If you are passing another unit through your breach lanes, they need to be there, too.

Marking. Set up your lane marking system at the task force "rock drill" site. That way everybody knows what it looks like. In addition, show how you plan to mark obstacle bypasses, and enemy FASCAM. If possible, do this in terrain that is similar to the terrain where you plan to breach. The NTC OPFOR does this for every attack.

Traffic Control. You have to have a method to control forward and rearward movement through the breach site. Rehearse it as well. This brings up the issue of who controls the breach site. Our doctrine does a good job of outlining this for river-crossing operations, but *FM 90-13-1* doesn't really address it. It's best to have one person controlling passage and fires in the immediate vicinity of the breach site. It may be the breach force commander, or it might be the S3. Regardless, you need to develop a method, publish it in your SOP, and practice it. At some point, you also need to consider when



Mine rollers are the best method to find the edge of a minefield and the best way to proof a breach lane, according to the author.

you can afford to go to two-way traffic to allow for casualty evacuation, etc.

MICLIC Reloads. Plan for it. You may need those systems again in order to get through the assault breach. Also a tool for trench clearing if you are in a bind.

MICLIC Trailers. Even if you plan to put your MICLICS on an AVLM, bring the trailers as least as far forward as the assault position. The M-60 and M-48 chassis are not the dependable platforms they once were. You need lift to do a reload, so you can also have a trans-load plan as well, just by taking the trailers forward behind one of your other vehicles. You can always drop the trailers in the assault position before you move forward to breach.

MICLIC Maintenance. This is critical. Next to the M-105 trailer, it's probably the most neglected piece of equipment in your motor pool. Train the operators, and **use** the TM.

Mine Plows. Tank crews must practice actual plowing with the MCB on a regular basis. They need to be as proficient with engaging the plow as they are at boresighting. They need to do it every day during a rotation, and get familiar with what types of soil allows them to use the plow.

Mine Rollers. Use them. They are the best method to find the edge of a minefield and the best way to proof a breach lane. If you are worried about the plows slowing your movement, consider hooking your plows up in the assault position at the same time engineers prep their MICLICS.

Situational Obstacles. Have a plan, during attacks or movements to contact

for using battlefield shapers. Consider the flanks, or defeat of the OPFOR's combined arms reserve (CAR).

OBSTINTEL. We often identify this as a PIR, but fail to adequately address it in the R&S plan. The task force engineer must be a player in both the development of the situational template and the R&S plan. The engineer must work with the S2 to template the enemy's use of battlefield shapers, including FASCAM, and then help prepare a plan to confirm or deny the template. The collection effort should also include locating where the combat systems that cover the OPFOR obstacles will fight. This will help you effectively position your support force.

Covert Breaching. This can be a low cost, high payoff operation. A covert breach may allow you to get at least some of your lanes in using a minimum of combat power, allowing you to preserve the rest for actions on the objective. You have to go after OBSINTEL anyway if you hope to successfully negotiate the OPFOR's prepared defense. With a little extra planning and coordination, you can move straight through to the objective using a defile drill. In order to make this work, your covert breachers must learn how to find the enemy overwatching the site and kill them with indirect fire.

More on OBSINTEL. Getting your engineers to the point on the ground where they can give you good OBSINTEL, in one piece, may be your biggest challenge. In order to really get you the information that you need, including mine type, obstacle composition, and depth, they need to get right up on the obstacle. Finding a safe route to that point poses the biggest risk. Consider using

The ACEs (Armored Combat Earthmovers) have to be used selectively because they were not designed to be bulldozers, and can be damaged when used on rocky ground.

task force scouts to pull your engineer reconnaissance into zone on routes they have already proofed. In essence, the scouts hand over the obstacle to the engineers, and continue to concentrate either on deeper NAI, or on finding the OPFOR's over-watching forces

Assault Breach. You may need to conduct final assault breaches in order to get onto the objective, once you've breached his tactical obstacles. If your template says he will use protective obstacles, then you need a collection plan to confirm or deny this point, and a plan to get through the obstacles if they're there.

Engineer Reconnaissance and OBSTINTEL. Reconnaissance is a sapper squad mission. All the tools for conducting reconnaissance exist within an engineer platoon, including a HMMWV. Sappers need to train on a regular basis with the task force scout platoon and be familiar with their TTPs and SOPs. Do not overlook the value or opportunity of conducting covert breaching operations.

More on OBSTINTEL. Look before you breach. Make sure someone actually puts eyes on the obstacle, and determines both depth and composition. You might find that the obstacle you are stacked up and dying behind is not a real obstacle to tracked vehicles after all. The OPFOR will put in berms instead of tank ditches if they are running low on time. Tanks and Bradleys can usually get over these without difficulty, but because no one goes to get a good look, we stack up behind the phony obstacle and take casualties trying to set the conditions to breach. The same goes for wire obstacles. The OPFOR will put wire with no minefield behind it, to make their obstacle system appear more formidable. From a distance, the BLUEFOR assumes that there's minefield behind it. Wire by itself does not stop tracked vehicles (unless it's 11 rows deep). The bottom line is you have to look.

MEDEVAC. Think about FAS or MAS support in the vicinity of the breach site. Even if everything goes well, this is where you stand to take the most casualties within the task force. Engineer units

Before tank fighting positions are dug, crewmen need to sight in their positions by lying flat at the same level as the gun tube.



lack adequate organic MEDEVAC assets, so having one of those task force assets in position is important.

Survivability

At the task force level, this translates to fighting positions. The trend at the NTC is wasted blade hours due to a lack of planning at the task force level, lack of preparedness to put blades to work at the company team level, and a failure to analyze terrain at all levels.

ACEs Aren't Dozers. They were never designed to be, and they can't dig in all the places dozers can. Train your operators to recognize where they can and can't dig. If possible, use Terrabase or other tools to produce "no dig" overlays before an operation. At the NTC, high ground is still high because it's rock, and hasn't eroded. Plan to dig smart. Rocky soil will bend an ACE every time.

Priorities and Time. Set priorities, make a time-line, and enforce it. The task force commander must set his priority by battle position and by combat system. Make it the gaining company/team's responsibility to escort the blades to the next battle position.

OPORD. Publish the time-line in the order. Put responsibilities and times in the "Sub-unit Instructions" portion of the order so that maneuver company commanders understand that the times involved are directed by the task force commander. If the information is buried in the engineer annex, no one will read it.

Dig Smart. No forward slope positions. They take much more time to dig and leave the tank or IFV with no good way to reposition or withdraw. Take advantage of the terrain. If the ground offers you an opportunity for reverse slope, use it. Think about reverse slope positions that look like a fan with the wide end toward the enemy. That gives the combat vehicle the opportunity to execute a berm drill so he pops up in a different position each time that he engages.

ACE/Dozer Chains. Chains can be a big aid to your equipment operators. The chain has a weight on the end that is marked with the correct depth for M1, and M2 fighting positions. That saves time on the battle position, instead of constantly moving vehicles in and out of holes to proof for depth. You should only



have to proof the hole once. In a different color, you can also mark the width required for each type of position on the chain, and stake it out beforehand.

Proofing/Sighting Positions. The tank crew must sight the position before the blades start to work. Sounds basic, but it doesn't always happen. Sighting needs to be done from the height of the gun tube when it fires. That means the crewmen need to get down on their bellies to sight in the position. It does no good to stand on the battle position and say, "I can shoot from here." I've seen tanks have to fight above ground, 10 meters in front of their perfect hole, because the crew failed to do this. Finally, before the blades leave, proof the position with the actual vehicle that's going to fight from that hole.

General Support Assets. Have a way to track the progress of GS engineer assets working in your sector. If you're the task force engineer, it's your responsibility to keep the task force commander informed on the progress of all engineer work done in your sector, regardless of who is doing the work. This goes for obstacle work as well. GS engineers don't report to you, and extracting information out of a higher headquarters may present a problem. Establish direct communications with the unit if possible, and use an LNO to monitor their progress and coordinate with your task force on the ground. To get started, you have to be able to put a timeline and plan in the GS engineers' hands when they arrive.

Countermobility

Countermobility equals effective obstacles integrated with fires. The trend at the NTC is that units are not executing obstacle groups with sufficient minefield density to achieve the desired obstacle effects or sufficiently integrating obstacles with both direct and indirect fires.

Class IV/V. Coordination, ordering, movement, and distribution of mines and wire for the defense are a maneuver S4 responsibility. It is not an engineer task. The engineer company must have a technical representative at the CL IV/V point, but responsibility for its operation rests with the S4. This includes a work detail to unload and uncrate mines. It takes a company day to uncrate 3,600 mines. If sappers are doing this, who is going to put in the minefields?

It Doesn't Take Engineers to Build a Fence. In order to get effective obstacle groups in place to support a task force defense in 36-48 hours, it's going to take more than just an engineer company. The

bottom line is that the engineer platoons are going to need help in the form of manpower, particularly in the erection of minefield marking. A 20- to 30-man detail from the task force nearly doubles the manpower available within an engineer company to construct obstacles. If the detail is building the fences, engineers can concentrate on getting the mines on the ground, and getting them armed.

Seven Steps of the Defense. These are the steps to building a defense that the Cobra Team coaches during the NTC Leadership Training Program (LTP) and during rotations. *Build your defense from inside the engagement area (EA) out.*

- Know the enemy and visualize how he will fight
- Select where, and determine how, to kill the enemy
- **Position obstacle groups to support direct fires**
- **Plan indirect fires to support direct fires**
- **Position forces to kill him with direct fires**
- Complete the plan: Site and execute obstacles, and prepare positions
- Rehearse

Note: Steps in bold can be simultaneous, and should be repetitive

Cover the obstacles by fire. Everybody's heard this before, but few units actually do it. That means sighting in the individual obstacle with the unit it supports prior to beginning work. One well-sighted obstacle is worth 10 that nobody can cover by fire.

OPORD. Publish the time-line in the order. Put responsibilities and times in the "Sub-unit Instructions" portion of the

order so that maneuver company commanders understand the times involved are directed by the task force commander. Define which company/team has responsibility for each obstacle group and when company/team commanders must be ready to site the individual obstacles with which engineer platoon leader. Avoid burying the information in the engineer annex.

Situational Obstacle Planning. Situational obstacles must have a target, a trigger, and a desired obstacle effect. By definition, situational obstacles have a trigger that allows execution to be withheld until specific criteria are met. You only execute if the specific event you identified during the planning process occurs. The criteria, or trigger, should be based on enemy or friendly actions, **not time.** Timing, between defined events, however, is critical if you're going to successfully get the obstacle on the ground in the right place at the right time to achieve the desired effect on the enemy.

- Define your trigger (event-based). If it is an enemy action, then it defines a specific place on the ground, and is therefore an NAI.

- Assign someone to observe the NAI in the R&S during the window of time you expect the trigger event to occur.

- The obstacle location also defines a specific place on the ground, and is therefore a TAI. Someone must have the responsibility of observing the TAI as well.

- Choose your delivery system.

- Do the time-distance analysis between the NAI and TAI. How long does it take the bad guy to get from your trigger point to the obstacle site. Does this give you enough time to execute the obstacle, given location of your delivery system



"It takes a company day to uncrate 3,600 mines. If sappers are doing this, who is going to put in the minefields?"

and how long it takes to execute the minefield?

- Integrate fires with the obstacle. If nothing is shooting at the enemy when he encounters the obstacle, then you've just wasted your time and assets.

- Position your delivery system so it can execute the obstacle. Sounds simple, but this requires planning, and additional time-distance analysis. For ground systems, consider a series of positioning areas along a route. Each positioning area is tied to one or more situational obstacles. Have a criteria that triggers movement of the ground system from one positioning area to the next. The trigger for movement should be event-based and linked to the DST in the same way as obstacle execution triggers.

Because it's a FASCAM doesn't mean it's a situational obstacle. FASCAM, particularly ground Volcano, provides us with a great tool to get a high density of minefield frontage down in a hurry in the defense. Think about using 48-hour duration Volcano minefields in order to get the requisite density of minefields in to achieve the desired obstacle effect. Because the minefield goes in quickly, you can take more time up front to make sure it's sighted properly and integrated with sufficient fires. As the number of sappers coming out of the back of tracks dwindles, we've got to rely on this system to achieve what we used to plan on conventional mines to do.

Minefield Marking. Do it, all four sides, period. There is a saying at the NTC, "If you want to find your 1SG, CSM, or chaplain, look in the nearest minefield first." If the bad guys see the minefield, and avoid it, you've effectively shaped the battlefield. The purpose of the minefield is to shape the battlefield so that we can kill him with fires where we want to. A minefield by itself is not a killing system except to civilians and friendly forces.

Brigade Directed Obstacles. Brigade-directed obstacles represent a double-edged sword, and are often misunderstood or misinterpreted. Brigade commanders use these obstacles to shape the brigade fight, particularly the deep battle. What they should not be used for is a tool to "get engineer effort going early so we don't lose work hours while the task forces develop their plan." If brigade-directed obstacles fall within the task force battle space, they require bottom-up refinement like any other obstacle group. That means that the engineers can't start to work on these obstacles until the task

force has refined the exact location and arrayed forces to integrate the obstacle with fires. Otherwise, you encourage engineer anarchy, resulting in ineffective obstacles that really are a waste of work hours.

The issue that is often lost on the task force is that they have an implied task to integrate the brigade directed obstacle with fires. In essence, the brigade commander is providing guidance in how the task force will array forces and fires when he issues graphics with brigade-directed obstacles or obstacle groups. The task force staff must recognize this fact during mission analysis, and then start the refinement during COA development and actual on-the-ground reconnaissance.

If the obstacle is deep, then the only obstacle effect you can achieve is to disrupt. Without direct fires, it is impossible to turn, fix, or especially block. In order to make deep obstacles work, you've got to have an observer plan, and indirect fires. Think about using in conjunction with CAS or attack aviation.

Volcano Consolidation. Avoid consolidation of Volcano assets into a single platoon controlled at brigade level. Ground Volcano assets are a task force commander's tool to shape the battlefield. Brigade-controlled ground Volcano obstacles are rarely coordinated with task force maneuver, and are not refined at task force level. As a result, task forces generally do not know when or where they go in and do not cover the obstacles with fires. The end result is usually fratricide and restricted maneuver for task force logistics assets.

Obstacle Group Design. Read *FM 90-7*. Plan your obstacle groups with sufficient minefield density IAW *FM 90-7* to achieve the desired obstacle effect. In addition, integrate obstacles with sufficient direct and indirect fires, as outlined in *FM 90-7*, to achieve the obstacle effect. Insufficient obstacle density and integration of fires is a recurring trend at the NTC. Engineer company XO's generally understand the calculation to determine how many minefields an obstacle group requires to achieve a specific effect, but often don't apply the full width of the avenue of approach to the calculation. The result is too little obstacle in too big an area to have the desired effect on OPFOR maneuver.

Engineers need to be able to rapidly do the math, on the ground with the task force commander, in order to tell him how much is needed in terms of minefield effort to achieve a specific effect, and how much he can realistically expect

to get on the ground based on time and assets.

Lanes. You have to plan for lanes, and put them on the graphics. A very common question to task force engineer is, "All right engineer, where are **all** of the obstacles?" The real question asked is, "Where can I drive my tanks?" The graphics already have the obstacle control measures on them, but that doesn't give exact locations. The exact location of minefields is unknown until each one is sighted in and executed. What the maneuver commander really needs to know is where can he plan to be able to move without blowing a hole in the bottom of his vehicle. Develop lanes. Publish them. Enforce their use by all equipment moving around the battlefield.

Think about fencing obstacle groups instead of individual minefields. This can save you time and resources. It takes less time to put in one fence around the outside of where you plan to put the obstacles than doing individual fences one at a time as you go along. It also takes less CL IV. Fencing the group can also confuse the enemy as to the exact location and orientation of your obstacles, causing him to expend more of his breach assets than necessary. If you fence the group, and don't get all the mines on the ground, the bad guys might not realize it, and go somewhere else.

Integration of Fires. It isn't enough to be satisfied with merely covering an obstacle by fire. In order to achieve your desired obstacle effect, both direct and indirect fires need to attack the enemy in a particular way for each type of obstacle group.

Obstacle Siting. This is where the rubber meets the road in terms of getting effective obstacles on the ground. In order for an obstacle group to be effective, it takes effort on the part of the engineer platoon leader, the maneuver company commander, and his FIST. The following represents "a way" to make this happen.

- The maneuver company commander and engineer platoon leader position on the BP.
- The engineer platoon and other vehicles attack as if they were the enemy.
- Plan where to mass fires.
- Put fire control measures on the ground.
- Locate key weapons on the BP (at least one per platoon).
- Site the obstacle group (all obstacles) with flags.

General

Here are some additional points that don't fit into any one category. These all relate to trends at the NTC. If you're able to fix these areas, you will do well in the rest.

Engineer Battlefield Assessment (EBA) /Estimate Process. Overall, this is probably the biggest demonstrated weakness among engineer company XOs during NTC rotations. Without a solid estimate process, you handicap your ability to effectively plan because you lack a firm grasp on the issues. The EBA need not be a formal product, but it should be a formal process that results in an understanding of the terrain, how the enemy will fight using the terrain, and our own capabilities. A number of units have good checklists in their SOPs, but fail to follow the process, use tools such as Terrabase, or coordinate with the rest of the staff to derive the information in a timely manner. During the mission analysis brief, it's not enough to merely be able to rattle off enemy engineer capabilities. The engineer has got to work with the S2 to show the "so what" of enemy engineer actions on the situational template and then wear the red hat during the wargaming process.

Use a Decision Support Template (DSM/DST). It's the only way you can track all the actions and reactions that you have planned or should have planned for a battle. It's the best way to keep your situational obstacle plan on track. Like the shoe company says, "Just Do It."

Seeing Ourselves. Have a good system in place to track the status of equipment, preparation tasks, and defensive preparations. Words are OK, but pictures are better, especially for tracking the current status of defensive preparations. Think about using a Commander's Card, which is nothing more than a cartoon showing each BP, the number of holes planned, the number complete, the obstacles planned, and the number complete. Use this to keep the commander updated so he can adjust priorities if you are ahead or behind schedule.

Engineer PSG. Use him. He is the most experienced NCO in the platoon, and we can't afford to have him out of the fight. Get him out of the HMMWV and forward into a track. It doesn't take an SFC to handle CASEVAC for a platoon; you've got the 1SG to handle that. Use him to control the tracks if the PL is on the ground. Use the wingman concept like the tankers do. In the defense, it's critical to get him on the ground pushing the troops who are building obstacles.

NCOs Pass Information. The engineer company XO cannot afford to spend his time during the fight glued to the radio mike. If he's doing that, he's in the reaction mode. He's the only person in the engineer company who is in position to be able to analyze information, perform predictive analysis, and think clearly without the distraction of bouncing across the ground in the cupola, trying to control formations, and react to threats. The engineer XO needs to think, predict, and make recommendations. This goes for engineer battalion XOs as well. We've got good, experienced NCOs. Use them.

Reporting. Do it. The reports you send are your input to decisions made by your boss that impact your unit in the immediate future. So, if you're told to do something that doesn't make sense, check the reports you have been sending higher. Garbage sent up the chain may mean something unpleasant coming back your way. A technique to use is to push information before someone asks for it. That way, you are sending it on your terms, not when you are in the middle of some other stress-producing event. You cannot afford to make the boss ask you for a location or a status. It's too late by then, because that means he doesn't have a clear picture, and if he doesn't have a clear picture, chances are the bad guy's are going to have a good day at your expense.

MEDEVAC. Get the TF to commit to helping or providing coverage for the engineers. We don't have the assets, they do.

Use the Task Force Commander to get what you need in order to support his task force. Make him your advocate to higher headquarters when it comes to getting the resources you need to make him successful. His voice carries more weight with the staff at the next level.

Risk Assessment. Everybody talks about it, and for the most part everybody understands the Force XXI model. However, unit emphasis is usually on accident prevention at the expense of taking a hard look at tactical risks. As engineers, we need to pay particular attention to how and where we execute FASCAM minefields and the risks they represent to the force. Lane planning and dissemination of graphics help.

Other Notes of Wisdom

I found the following notes on a sheet of paper taped to a desk in the Cobra trailer at the NTC, titled "102 National Training Center Rules to Live By." I didn't reprint all 102, but picked out the ones applica-

ble to the M/CM/S BOS. They are based on common sense and get validated every rotation.

- Time spent on RECON is never wasted.
- Conduct a rehearsal.
- Don't drive toward blinking lights or yellow smoke.
- Resource your most dangerous COA.
- Hope is not a method (nor a battlefield operating system).
- Wire is not an obstacle to mounted movement.
- Don't put obstacles where you want them to come.
- An obstacle not covered by fire is not an obstacle.
- Any action not rehearsed will fail.
- Kill sacks are called kill sacks for a reason.
- Put smoke on, or behind your enemy, not on yourself.
- To waste engineer blade time is the same as wasting lives.
- If the enemy's range is greater than yours, execute a reverse slope defense.
- DSTs work.
- Terrain is neutral. The advantage is gained in how it's used.
- A berm is not always an obstacle.
- At stand-to, check your obstacles.
- Just because you build an EA, doesn't mean they will come.
- The time to cease defensive preparation is when you see the dust cloud on the horizon.

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