Volcano Minefield Planning at the Brigade Combat Team and Below

By CPT Gregory Shepard and CPT Doni Wong

For the past several years, the National Training Center (NTC) has operated using decisive-action training environment scenarios after nearly a decade of counterinsurgency (COIN) training. Before the COIN era, brigade-sized defenses at NTC included large-row minefields constructed using conventional mines such as the M15 or M21 anti-tank land mine. While many of the U.S. Army's senior leaders at the brigade level and above may recall these training events at NTC in the 1990s, many current planners at the battalion level and below have not participated in them. Moreover, changes in U.S. landmine policy from 2004, 2011, 2014 and 2020 restrict the munitions available to current planners[1] who did not defensively plan in the 1990s.

The U.S. Army can currently only use mines with a self-destruct mechanism.[2] As a result, defensive obstacle plans rely on the artillery-delivered remote anti-armor minefield, area-denial artillery munition and Volcano delivery system for emplacing large minefield obstacles.

Though the Volcano minefield system transitioned to the focal point of most brigade combat team (BCT) defensive plans at NTC, observer/coach/trainer (O/C/T) observations and discussion during after-action reviews (AAR) have highlighted the task-force staffs' unfamiliarity with the system and its employment. Unfamiliarity with the system results in failure to identify the proper triggers required to ensure the mines are deployed and still active when the enemy arrives, and/or creates unrealistic expectations for what the operators can achieve with the Volcano system. Moreover, many of the requirements for Volcano employment are influenced by multiple warfighting functions, including intelligence and command and control. To successfully emplace a minefield, a task-force staff must know the limitations of the Volcano system and be comfortable with using the R>EACT (rate, emplacement, arming, command approval and travel) formula.

Recap of planning for defense (basics)

Proper and thorough intelligence preparation of the battlefield (IPB) sets the conditions for a successful defense. Achieving the task-force commander's intent is ensured by understanding the enemy's composition, capabilities, most likely order of battle and most likely course of action (CoA) – and bringing it all together. Successful IPB reduces the number of likely enemy CoAs from infinite to a few likely ones and is a primary driver in the development of the task force's plan.

Likewise, identifying the reconnaissance assets required to observe named areas of interest (NAIs) to further determine the enemy's actions by observing for specific indicators is done during this process. The indicators observed guide commanders and their staffs through the decision-making process and actions to counter the enemy. From here, the characteristics of the defense and engagement-area development can be used to form a cohesive plan that addresses the current situation.

Determining how to best use all assets available to the task force (indirect fires, obstacles, information-collection assets, survivability positions, etc.) should not be done in a vacuum or by a single warfighting function. Including the engineer team who will assist in constructing or deploying the obstacles in the planning process is critical. Understanding the engineers' capabilities and limitations is vital to creating a realistic and feasible obstacle plan.

Likewise, engineers must be able to describe to the task force the obstacle's possible effects and the limitations on its construction, especially regarding time. Building a shared understanding and habitual working relationship with the engineer team and the maneuver commanders they are supporting accelerates the plan's link-up and dissemination. Also, this will aid the reduction of poor or overly vague guidance from maneuver commanders regarding what they want the obstacle to accomplish. The engineer's advice can help ensure the ground commander's intent is still met while working within the limits of personnel, time and equipment. An example of this is the employment of Volcano minefield systems

Volcano minefield employment, considerations

The Volcano system in the armored brigade combat team (ABCT) and the Stryker BCT (SBCT) are similar in design but vary in capabilities. Specific obstacle effects are achieved by combining minefield patterns in different ways. For example, a single-row pattern creates a single minefield obstacle approximately one kilometer long.[3] For a more detailed explanation of how to arrange minefield patterns to achieve specific effects, see Army Technical Publication (ATP) 3-90.8, ***Combined Arms Countermobility Operations***, and confer with the supporting engineer unit's leadership.

Figure 1. Volcano system within an ABCT.

Figure 2. Volcano system in an SBCT.

During the planning process, the task-force staff considers the number and pattern of minefields required to create the intended effect. Though it is possible to reload the Volcano system and execute successive minefields, the time required for emplacement may not always be available. For example, the standard planning factor for reloading a Volcano system is less than one hour. However, observations and multiple AARs as an O/C/T have shown us that most engineer units do not train this task to standard. This lack of training is problematic when the squad or platoon is attempting to reload a Volcano system for the first time.

Moreover, some engineer units only plan to use the two Volcano system operators to execute the reload because the rest of the engineer platoon is generally recovering from 36-48 hours of continuous obstacle construction. In this case, the expected reload time is a few hours. If the task force is only approved for a four-hour-duration[4] minefield, the first minefield may be close to entering the self-destruction window by the time the same Volcano system begins employing any subsequent minefields.

R >EACT formula and execution criteria

Volcano minefields are comprised of scatterable mines (SCATMINES) that have a self-destruct time and therefore must be treated as situational obstacles.[5] A situational obstacle is defined as an obstacle a unit plans and possibly prepares prior to starting an operation but does not execute unless specific criteria are met. It's important to understand that situational obstacles use an event-based criteria or trigger and not a time-based criteria.[6]

Again, it is imperative for the task force to conduct a comprehensive IPB during the military decision-making process to identify what routes the enemy is likely to travel. Once the likely enemy routes are identified, the task force staff can use the R>EACT formula to help aid in planning for the Volcano emplaced minefield.

- **R** = Expected travel time of enemy forces from the NAI associated with the minefield to the minefield's templated location. The task force needs to use its IPB to determine enemy rates of march along expected avenues of approach and how those rates may be affected by terrain, light/visibility and weather.
- **E** = Emplacement time of system. The emplacement time is the amount of time it takes for the Volcano system to drive through the centerline of the minefield and deploy the SCATMINES. For planning purposes, this is assumed to be several minutes but should be rehearsed by the emplacing unit as the emplacement time is also affected by terrain, light/visibility and weather.
- **A** = Arming time of the mines. The arming time is the amount of time it takes for the mines to arm themselves once fired from the Volcano system.
- **C** = Command-approval time. The command-approval time is the entire process from observer to Volcano operators. It includes the time required for the observer to identify and report the enemy's location and the time for the approval authority to receive all specific event-based triggers and make a decision. It also includes time for the approval authority to communicate to the emplacement authority, and time for the emplacement authority to communicate to the crew operating the Volcano system. The command-approval process is much more complex than perceived by everyone in the approval process due to the difficulties units face with establishing effective communications over distance at NTC. It is important for all those involved in the command-approval process to understand the primary, alternate, contingency and emergency (PACE) plan for how each element will communicate with the other.
- **T** = Travel time of the Volcano system. The travel time is the time required for the Volcano to physically drive from its hide site to the templated minefield location and then from the minefield location out of the engagement area behind the battle positions. It is important to ensure the effects of terrain, light/visibility and weather are included in this time as well.

Once task-force planners calculate the total "EACT" time, they establish an NAI at an appropriate distance away from the templated minefield along the enemy expected avenue of approach such that "R" is greater than the total sum of the "EACT" times (see examples in Figures 3 and 4). After establishing the NAI, task-force planners specify a primary and alternate observer for the NAI, integrate the NAI into the information-collection matrix and create a decision point associated with the NAI. A fully developed decision point is critical and must contain a comprehensive set of criteria founded on event-based triggers to determine if and when the minefield will be executed.

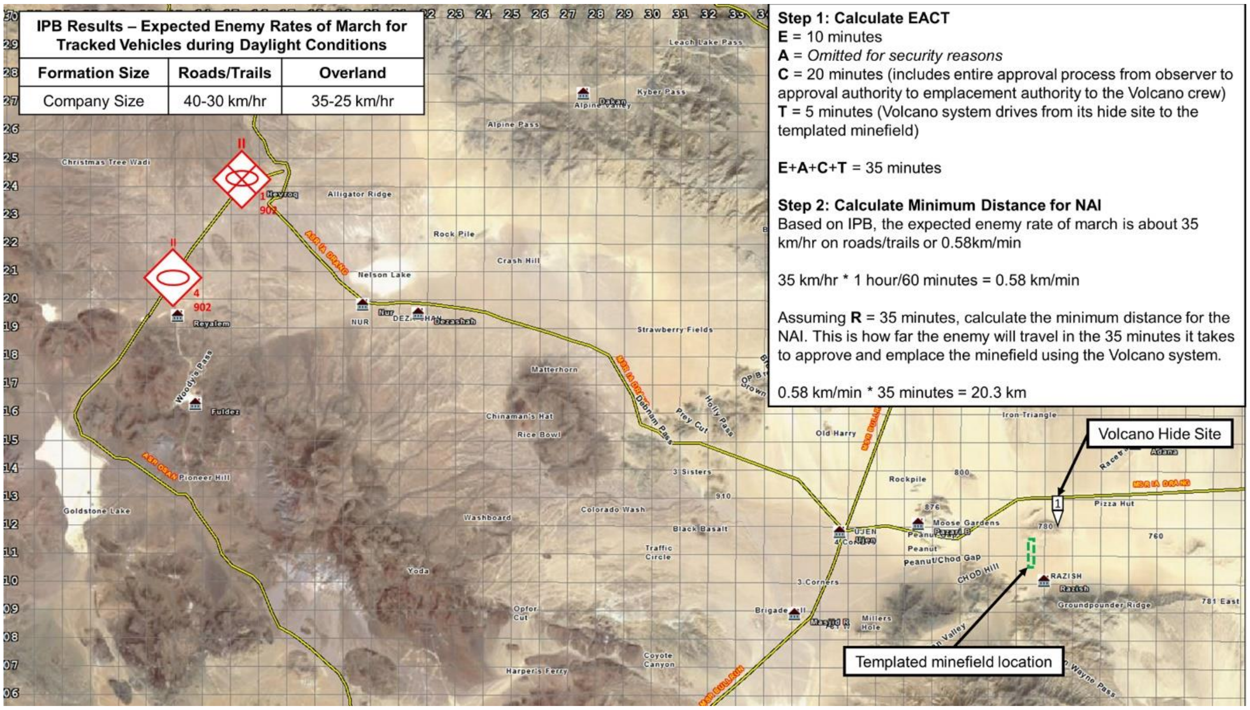

Figure 3. R>EACT formula example.

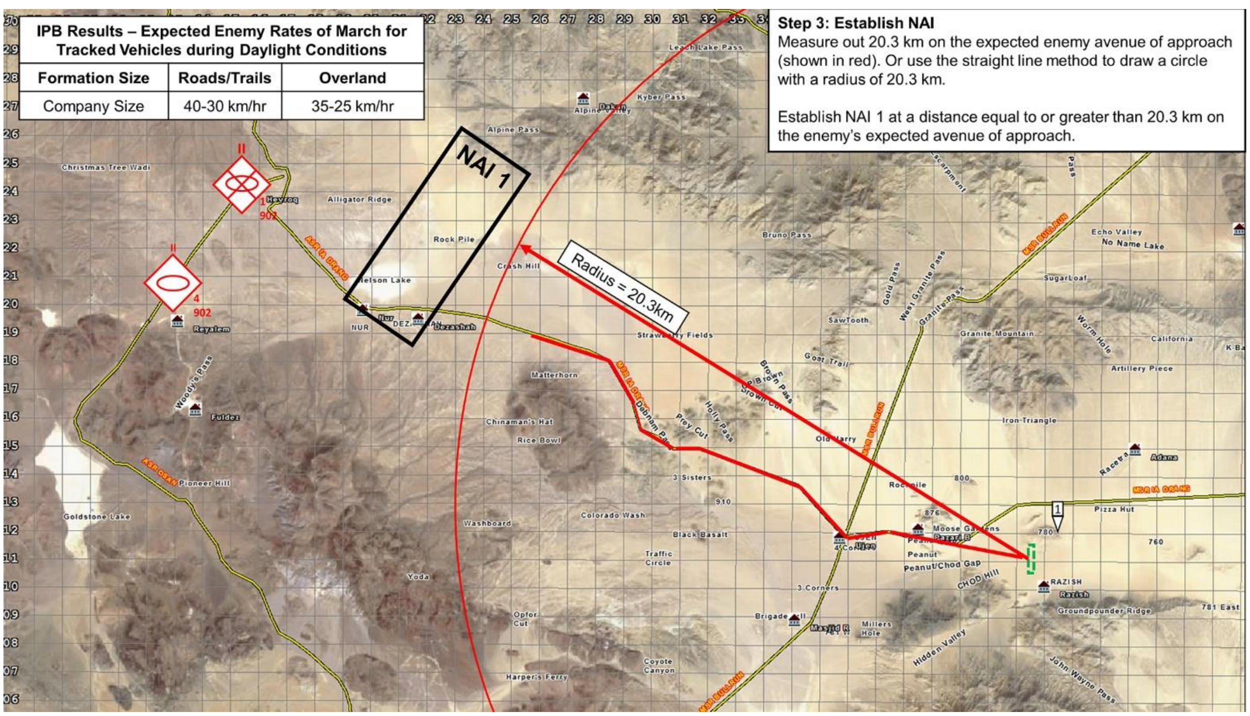

Figure 4. R>EACT formula example No. 2.

The execution criteria for emplacing the minefield must be clearly defined by the task force staff using event-based triggers. The observers, the approval authority and the emplacing authority must all have a clear understanding of the triggers. For example, is it a friendly event-based trigger such as the cavalry troop, forward in the screen, withdrawing behind the minefield? Or is it enemy event-based with six to eight enemy vehicles driving through the NAI? Or is it both? What if the reconnaissance asset is forced to withdraw due to a reason beyond being decisively engaged – is the Volcano minefield still emplaced without observation? Or, if the reconnaissance asset identifies six to eight enemy vehicles driving through the NAI but the reconnaissance asset can maneuver and force the enemy to withdraw from the avenue of approach, is the Volcano minefield still executed?

All personnel within the command-approval process must understand the event-based triggers that define the specified execution criteria of the minefield as well as the conditions that may cause them to become invalid.

Understanding the event-based triggers that meet the execution criteria is important enough to warrant a separate rehearsal of the complete approval process. This rehearsal benefits the task force in three ways:

- The unit can run through various scenarios to ensure everyone clearly understands the event-based triggers;
- The rehearsal allows the unit to test its PACE plan to ensure it is applicable; and
- The rehearsal provides the unit with an understanding of exactly how long it will take to approve the minefield's emplacement. Having a clear understanding of the event-based triggers reduces the likelihood of a premature or delayed emplacement of the minefield.

Recommendations for way forward

Task-force staffs need to understand that the Volcano minefield delivery system is limited and is planned using the doctrinal patterns. Confer with the supporting engineer unit for details about capabilities.

Task-force staffs also need to understand and use the R>EACT formula to plan for the execution of a Volcano emplaced minefield. Ensure an NAI is included in the information-collection matrix with a specified primary and alternate observer.

Volcano minefields must use event-based triggers. The execution criteria must be clearly defined using event-based triggers and understood by all personnel involved in the command-approval process.

Rehearse the command-approval process to ensure various scenarios concerning event-based triggers are understood and to avoid premature or delayed execution

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Notes

[1] Christopher T. Kuhn, ***Terrain Shaping in the Twenty-First Century***, U.S. Army War College, April 1, 2014.
[2] U.S. Department of Defense, ***DoD Policy on Landmines*** [memorandum], Jan. 31, 2020.
[3] Project Manager Close-Combat Systems (PM CCS), "Volcano Multiple Delivery Mine System," ***PdM Area Denial***, www.pica.army.mil/pmccs/areadenial/legacymines/volcano.html.
[4] Ibid.
[5] ATP 3-90.8.
[6] Ibid.

Acronym Quick-Scan

AAR – after-action review
ABCT – armored brigade combat team
ABOLC – Armor Basic Officer Leader Course

ATP – Army technical publication
BCT – brigade combat team
CoA – course of action
COIN – counterinsurgency
IPB – intelligence preparation of the battlefield
Km/hr – kilometer/hour (Figures 3 and 4)
NAI – named area of interest
NTC – National Training Center
O/C/T – observer/coach/trainer
PACE – primary, alternate, contingency, emergency
PM CCS – Project Manager Close-Combat Systems
R>EACT – rate, emplacement, arming, command approval and travel
SBCT – Stryker brigade combat team
SCATMINES – scatterable mines