Lessons Learned

Engineer Synchronization

By Captain Whitney Wolf

"It was the old story of non-integration of the obstacle plan with the artillery plan and the company/team fire plans. There appears to be a basic misunderstanding concerning the use of obstacles. This trait has been exhibited by every rotating unit I have tracked at the Combat Maneuver Training Center. There is something basic that is broke (sic) in the training program for combat arms. The usefulness of obstacles is completely negated if they are not covered by some kind of fire. Every obstacle that is put in and not covered in a fire plan represents a criminal waste of time and effort. This waste will be paid for in dead soldiers and lost battles against any enemy force that understands its business."

From a 1991 observer/controller internal report at the Combat Maneuver Training Center

The Challenge

As operations research and systems analysts, our job is to confirm or deny a trend or suspicion of a trend by using some analytical method. In 1994, personnel in the Engineer School's Directorate of Evaluation and Standardization were tasked to determine why Army combined arms maneuver units succeed or fail to synchronize engineer planning and execution during combat operations. We thought of many possible reasons why engineers sometimes fail to operate successfully and why they sometimes succeed. At first it appeared to be an unanswerable question because, if we could determine the cause of all synchronization problems, somebody would have done so much earlier.

To find the answer, we used the archive of Take Home Packages, which outline the training performances of units rotating through the National Training Center (NTC). To accumulate a data base, we analyzed 34 staff elements operating at the NTC in 1991 and 1992 during their unit's first battle. We assumed that the first battle would indicate a unit staff's training level prior to deployment to the NTC as well as their readiness for deployment to a contingency operation.

After several weeks of research, a performance trend began to emerge. No single "magic" reason was found, but some common factors or actions did correlate with the units' ability to successfully coordinate planning and execute engineer tasks on the battlefield. The good news is that the answer to our question rests with basic tasks that all combined arms staffs should know and use.

Methodology

The 34 battles were rated as a success or failure based on mission accomplishment, battle losses, and the ability of each unit to conduct follow-on missions. Then we determined the effectiveness of the engineer staff officer and maneuver staff members in specific areas of coordination and synchronization. Often we found that the omission or lack of synchronized engineer support was highly detrimental to mission success, although some areas had less impact on battle outcome than others. By analyzing the degree of success in selected areas and relating those factors to the success or failure of the battles, we could see the significance of specific engineer activities.

While reviewing the reports, we focused on the following tasks and functions:

- The overall synchronization and execution of tasks by elements on the battlefield.
- The staff engineer's understanding of the maneuver commander's intent.
- Engineer integration into the intelligence preparation of the battlefield (IPB).
- Engineer integration into the functions of reconnaissance.
- Engineer support in obstacle and breaching operations.
- The effectiveness of the engineer estimate.
- Use of rehearsals.
- Use of brief backs.
- The degree to which obstacles were tied to direct and indirect fires.

A high correlation was found between the success of these activities and battle success.

Results

Success

Based on our analysis, the synchronization of engineer planning and mission execution generally will succeed when the combined arms team/task force—

- Exercises repetitiously as a complete combined arms team (with all Battlefield Operating Systems (BOS) elements represented) at their home station.

- Performs their staff planning exercises many times under a capable senior maneuver staff officer and with an experienced staff engineer officer.

- Applies the staff estimate process as defined in the Command and General Staff College Student Text 100-9.

- Effectively uses synchronization matrices.

- Conducts effective back briefs.

- Conducts effective rehearsals.

- Conducts effective staff huddles/information sharing.

- Performs staff cross talks.

- Possesses an efficient TOC setup.

- Ensures clarity in the stated commander's intent.

- Thoroughly understands the mission end state.

Failure

We predict that synchronization of engineer planning and/or execution of the combined arms mission will generally fail when—

- The engineer staff officer is not well integrated into the total staff as a team member.

- The engineer does not integrate the engineer battlefield assessment (EBA) into the IPB process.

- The engineer staff officer and the engineer units perform poorly during execution of the combined arms obstacle operations.

- The engineer staff officer and the engineer units perform poorly during execution of the combined arms breaching operations.

- The engineers do not participate in the combined arms team's rehearsals.

- The engineers do not back brief their leaders.

Statistics

If you are a numbers person, the following statistics will be of interest:

- A well-practiced total combined arms team had a 57-percent success rate. When the entire staff and all subordinate units did not use good synchronization techniques (such as staff huddles, efficient TOC layout, and an integrated staff-estimate process), the unit lost 80 percent of the time.
- When the engineers developed a substandard engineer battle analysis or engineer estimate, the unit had a 73-percent failure rate for that activity.
- When a maneuver commander's overall mission included a breach as a subtask and the breach failed, the overall mission failed 73 percent of the time.
- When the engineers provided good combined arms obstacle support, 100 percent of the battles were successful. This was the case in more than half of the battles included in this study.
- A successful battle resulted 83 percent of the time when rehearsals were done fully with all units of the combined arms team. This means they did not simply talk through the rehearsal or had only part of the units participating. When rehearsals were performed improperly, with each slice rehearsing separately, the units failed 85 percent of the time.

Recommendation

Apply these results! If you "think" your unit is ready for the NTC, it probably is not. Read the following excerpt from the study by Thomas J. Thompson, Robert J. Pleban, and Patrick J. Valentine:[1]

*"**Synchronization of staff functions.** The battalion staff members who completed questionnaires and were interviewed prior to their CTC [combat training center] rotations generally felt that they received adequate time to train as a staff and with the combat support and combat service support slice elements as well. In questionnaire and interview responses after the rotations, these same staff members expressed more concern with the infrequency with which they had trained. This was particularly true with engineer, aviation, and fire support elements...It was typical across battalions that respondents only realized the existence of shortcomings in staff preparation after their CTC rotations. This suggests that the CTC continuous operations environment, which was not under the control of the battalion or its parent unit, was needed to reveal the true status of training within the staff."*

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Savings To Fort Dix Through Troop Construction

Project	Estimated Civilian Contractor Cost	* Actual Cost Using Troops (rounded)	Estimated Savings
Leadership Reaction Course	$110,000	$ 32,000	$ 78,000
EPW Compound	70,000	16,000	54,000
M1A1 Tank Range	290,000	90,000	200,000
Artillery Observation Tower	35,000	13,000	22,000
Bridge Replacement	75,000	24,000	51,000
Warehouse Replacement	** 450,000	** 185,000	** 265,000
TOTALS	$1,030,000	$360,000	$670,000

*** Since troop labor is paid from training funds, Fort Dix only had to pay for materials, rentals, and outside services from project funds.**

**** Includes future electrical and fire-suppression system costs.**

This high-payoff and innovative team concept resulted in quality construction on training and infrastructure facilities for the installation. The project also provided an outstanding training opportunity for Reserve and National Guard engineers.

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The study results on page 45 can predict the performance of a unit on the battlefield. If you don't see at least a fair performance of these functions in your unit, you're probably headed for disaster! If you are part of a combined arms team and you see these functions performed well, your unit is likely to win the battle.

Conclusion

There it is—the answer to how and why Army combined arms maneuver units' planning succeeds or fails to synchronize engineer planning and execution during combat operations. Although successful performance of all the tasks and functions is desired, it does not guarantee success. In some of the battles included in this study, the combined arms teams did everything correctly and still lost the battle.

The unanswered question is: Knowing that these tasks/functions lead to success on the battlefield, why don't engineers perform them better? "Time" may be the best answer. With everything that combined arms teams must do during a battle, some tasks fall to a low priority. Based on the key findings of this analysis, we strongly recommend that commanders and staff officers of all combined arms team elements use the study results as landmarks on the path to success on the future battlefield.

Reference:

[1]Thomas J. Thompson, Robert J. Pleban, and Patrick J. Valentine (1991). *Battle Staff Training and Synchronization: The Integration of Functions Critical to Combat Operations*, page 194.

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