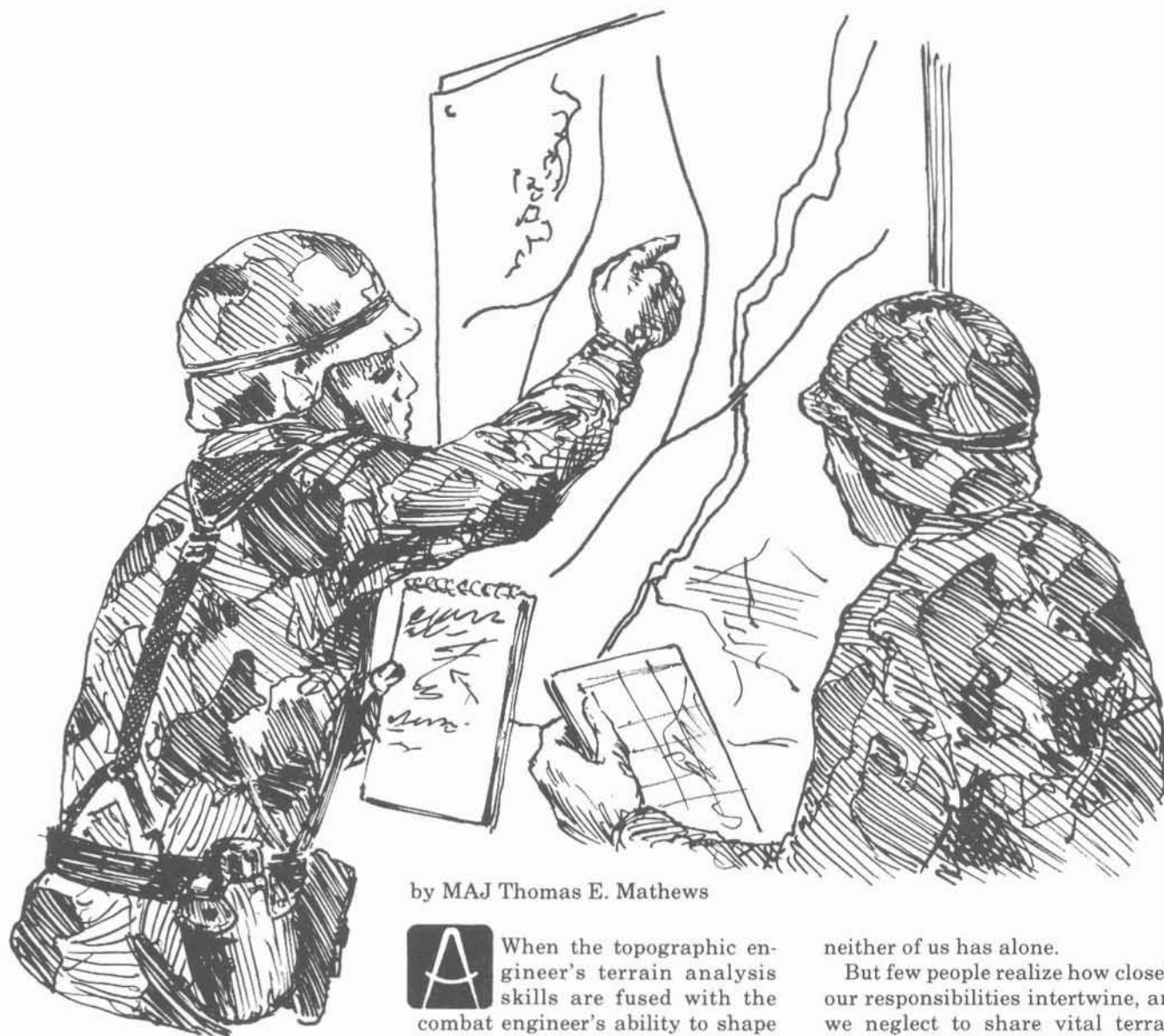


# Combat Engineer and Topographic Engineer Missions Intertwine



by MAJ Thomas E. Mathews

**A** When the topographic engineer's terrain analysis skills are fused with the combat engineer's ability to shape the battlefield, we have immense influence over how the battle will be fought. Together, we give the combined arms team added muscle that

neither of us has alone.

But few people realize how closely our responsibilities intertwine, and we neglect to share vital terrain information that could well make the difference between victory or defeat.

## Mobility

Combat engineers need to detect enemy minefields and obstacles in order to plan countermine or counterobstacle missions. Topographic engineers can predict likely locations—saving time and focusing the engineer effort. As minefields and obstacles are reported, the topographic engineers can plot the locations and characteristics on map overlays for dissemination.

When a minefield or obstacle is neutralized, engineers must report through the assistant division or corps engineer so the terrain team can annotate the master map over-

lays for dissemination to others.

To plan a gap or river crossing, combat engineers need details about the river or gap not available on topographic maps. Reconnaissance is warranted if terrain and time permit. The findings should be funneled to the division or corps terrain team.

When reconnaissance isn't possible, combat engineers should check with the terrain team to see whether information on the river or gap is available in the terrain data base (story page 27). Once the gap or river is crossed, combat engineers must

share their findings with the terrain team so the master map overlays can be annotated.

Reconnaissance is also preferred when planning construction and repairs of roads, trails or airstrips. But if conditions don't permit, the terrain team may have useful data. Once the roads, trails or airstrips are constructed or repaired, information must again be reported through the assistant division or corps engineer to the terrain team so master overlays can be annotated.

| COMBAT ENGINEERS                                                                                                                                                                                                                                                                               | TOPOGRAPHIC ENGINEERS                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Countermine or Counterobstacle</b> <ul style="list-style-type: none"><li>*Detect minefields and obstacles</li><li>*Plan/estimate<ul style="list-style-type: none"><li>Neutralize</li><li>Bypass</li><li>Breach</li><li>Clear</li></ul></li><li>Mark minefields</li><li>*Report</li></ul>    | <b>Prepare/Exploit Standard Terrain Factor Overlays</b> <ul style="list-style-type: none"><li>*Surface configuration</li><li>*Surface materials</li><li>*Surface drainage</li><li>*Vegetation</li><li>*Obstacles</li><li>*Transportation</li></ul>                                                                                                                                          |
| <b>Gap Crossing</b> <ul style="list-style-type: none"><li>*Reconnoiter</li><li>*Plan/estimate<ul style="list-style-type: none"><li>Deploy bridging</li><li>Prepare assault site</li><li>Prepare far shore</li><li>Construct/emplace bridging</li><li>Cross</li></ul></li><li>*Report</li></ul> | <b>Prepare/Exploit Tailored Overlays</b> <ul style="list-style-type: none"><li>*Cross-country mobility<ul style="list-style-type: none"><li>For specified vehicles</li><li>Wet or dry weather</li></ul></li><li>*Avenues of approach</li><li>*Landing zones</li><li>*Drop zones</li><li>*Prediction of enemy minefields and obstacles</li><li>*Location of construction materials</li></ul> |
| <b>Combat Roads, Trails and Forward Aviation</b><br><b>Combat Engineering (FACE)</b> <ul style="list-style-type: none"><li>*Reconnoiter</li><li>*Plan/estimate<ul style="list-style-type: none"><li>Construct/repair</li><li>Maintain</li></ul></li><li>*Report</li></ul>                      | <b>Update Topographic Map Information</b> <ul style="list-style-type: none"><li>*Update map information on roads, bridges, airfields</li><li>*Update other map features for currency, battle damage</li><li>*Depict minefields and obstacles</li></ul>                                                                                                                                      |

\* Task where terrain information should be exchanged between combat and topographic engineers.

## Do you know?

### Maps and charts differ in that—

- *A map is a graphic representation—usually on a plane surface and at an established scale—of the earth's natural and artificial features positioned relative to a coordinate reference system.*
- *A chart is a special-purpose map, generally designed the terrain team will tailor its answers to your needs.*

## Countermobility

Combat engineers normally perform map, ground or aerial reconnaissance to estimate the best locations for emplacing minefields, obstacles and demolitions to deny the enemy mobility.

Topographic engineers can provide cross-country mobility analyses

and other tailored products that identify sites with potentially high payoffs (story page 27). They are ideal for obstacle planning, followed by ground reconnaissance to verify the merits of the site. Without them, combat engineers can waste valuable time and still end up guessing.

As countermobility missions are executed, engineers and maneuver units must report them through their division and corps engineers so terrain teams can annotate master map overlays and disseminate the information.

| COMBAT ENGINEERS                                                                                                                  | TOPOGRAPHIC ENGINEERS                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mine Warfare, Obstacle Demolitions or ADMs</b><br>*Reconnoiter<br>*Select site<br>*Plan/estimate<br>Execute mission<br>*Report | <b>Reproduce Map Overlays</b><br>Same as all of the mobility tasks except mobility models used for cross-country mobility analyses for countermobility tasks are based on characteristics of enemy mechanized and wheeled vehicles. |

\* Task where terrain information should be exchanged between combat and topographic engineers.

## Survivability

Survivability involves camouflage and concealment, as well as construction of fighting, protective and decoy positions. Each requires a reconnaissance, if possible, before planning and estimating.

Terrain teams can tailor products that provide information on cover and concealment, observation and fields of fire, and other information to assist in survivability planning. They should also depict locations of

fighting, protective and decoy positions, warehouses, hospitals, tunnels, utilities, food stocks, and POL.

To improve the data base, all new information must be funneled to the terrain team.

| COMBAT ENGINEERS                                                                                                                                                                                                                                            | TOPOGRAPHIC ENGINEERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fighting, Protective and Decoy Positions</b><br>*Reconnoiter<br>*Plan/estimate<br>Deploy assets<br>Construct<br>*Report<br><br><b>Camouflage and Concealment</b><br>*Identify vulnerabilities<br>*Plan/estimate<br>Deploy assets<br>Construct<br>*Report | <b>Prepare/Exploit Standard Terrain Factor Overlays</b><br>*Surface configuration<br>*Surface materials<br>*Vegetation<br><br><b>Prepare/Exploit Tailored Overlays</b><br>*Cover and concealment maps for winter and summer<br>*Concealment potential from horizontal/vertical observation<br>*Observation/fields of fire maps, line of sight for weapons and radar<br><br><b>Enhance Topographic Map Information</b><br>*Urban area maps<br>Facilities (warehouses, hospitals, tunnels)<br>Utilities<br>Food stocks<br>POL<br><br><b>Reproduce Map Overlays</b> |

\* Task where terrain information should be exchanged between combat and topographic engineers.

## Summary

If you feel that combat and topographic engineers have totally different functions, think again. Both have the mission to exploit or reinforce the terrain. Both advise their commanders on how to best use the battlefield terrain. Both require "terrain sense." Both need the best possible terrain information and rely on each other to get it.

The better we understand this concept, the better engineers we are, and the stronger the Army we support.

*MAJ Thomas E. Mathews is the Mapping, Charting and Geodesy Doctrine Development Coordinator at the Defense Mapping School. His topographic engineer assignments include command of the Terrain Analysis Detachment supporting III Corps, and Chief of the Terrain Evaluation Division, Defense Mapping School.*

*His combat engineer assignments include command of panel bridge*

*and mobile assault bridge companies, S-1 of combat heavy and assault bridge battalions, and assistant S-3 of a combat heavy battalion.*

*MAJ Mathews has bachelor's and master's degrees in physical geography from the University of Michigan. He is a graduate of the Command and General Staff College.*

---

## Do you know?

---

*The Defense Mapping Agency (DMA) inventories over 21,000 different 1:50,000 scale topographic maps—a fraction of the line items in the total DMA inventory.*

*Even so, less than 50 percent of the world's land area has been mapped at a scale of 1:50,000 and only 80 percent at a scale of 1:250,000, according to a U.N. study.*

---

## Writer's Guidelines

---

Do you have any articles, photographs, or artwork to submit to ENGINEER? Here are some tips.

**TOPIC:** We focus on combat engineering; however, any articles of interest to engineers are welcome. Write in active voice and be as concise as possible. Please give your article a title, too.

**LENGTH:** Let your subject dictate length; generally, articles should be two to six pages, double spaced.

**PHOTOGRAPHS AND ARTWORK:** Besides photographs and artwork which supplement articles, photographers and artists should submit any work that may be of interest to engineers. Your photos should be 5 x 7 black and white, glossy. Please include a caption and photo credit. Drawings should be legible, but do not have to be camera ready.

**DEPARTMENTS:** We are always looking for items for our departments:

- Letters to the Editor.
- Lessons Learned.
- News and Notes.
- Personal Viewpoint.

**ENGINEER PROBLEM:** Please submit your challenging—but not too hard—Engineer Problems. Problems should be referenced to a manual, but must be original. They should be checked for accuracy and should strengthen combat engineer skills as well.

**COVER LETTER:** When submitting material to ENGINEER, enclose a cover letter with your name, address, and phone number. Also, please include biographical information such as military and civilian education and past and present assignments.

If you have any questions, please call us.

(703) 664-3082, AV 354.