

The Engineer Bradley Fighting Vehicle

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This article presents preliminary observations regarding the possible replacement for the M113 Armored Personnel Carrier. The Engineer School is continuing to explore materiel and doctrinal concepts related to the Engineer Bradley Fighting Vehicle. Additional information will be published as it becomes available.

To be a relevant force multiplier in the 21st century Army, combat engineers need a mobile and survivable platform from which to fight. We believe that the vehicle tentatively called the Engineer Bradley Fighting Vehicle (EBFV) is the answer. Since the mid-1980s, combat engineers have struggled to keep pace with the modernized forces they support, which are equipped with M1 Tanks, M2 Infantry Fighting Vehicles, and M3 Cavalry Fighting Vehicles. Too often, combat training center rotations demonstrate that engineer equipment is outdated and will not satisfy the demands of combat in the 1990s, nor will it meet the needs of our 21st century Army. The M113 Armored Personnel Carrier is a perfect example: It is slow, has a high deadline rate, provides little protection, and serves only as a troop and cargo carrier.

The Army is transitioning from a mechanized to an armored warfare force. In mechanized warfare, soldiers move to an objective in a vehicle and dismount to conduct their mission. In armored warfare, soldiers move on the battlefield in a survivable, firepower-laden platform that allows them to conduct their mission while mounted and under armor. The implication for combat engineers is that we need to progress from a sapper-based force to an equipment-based force. Moreover, our equipment must provide the functions needed to accomplish our mission.

The characteristics of the Force XXI battlefield will demand even more from combat engineers. Like the maneuver forces we support, combat engineers need platforms with speed, versatility, and survivability. Force XXI technologies will allow greater dispersion, enable distributed operations, and increase the tempo of battle as never before. All these Force XXI enablers put demands on providing mobility to the force unlike any previous doctrinal change. Equipping combat engineers with the Engineer Bradley Fighting Vehicle is a step in the right direction. It is essential to the future of combat engineer forces and to the success of maneuver forces.

Concept Experimentation Plan

This article discusses the initial results of an ongoing Bradley Concept Experimentation Plan conducted by the Engineer Brigade of the 4th Infantry Division and the U.S. Army Engineer School. The end state for the evaluation is twofold: to determine if the Bradley is suitable for combat engineers and to determine the advantages and disadvantages of the Bradley as a combat engineer platoon vehicle. Throughout the Bradley experimentation, the focus of the Engineer Brigade was to provide the engineer community with feedback in three areas:

- Tactics, techniques, and procedures (TTPs) for conducting combat engineer missions using Bradleys.
- The load plan, so engineers can carry what they need to execute their combat engineer missions.
- The level of gunnery proficiency engineers must achieve and how engineer training is balanced with gunnery training.

In February 1998, A Company, 588th Engineer Battalion, made history when it fielded nine M2A0 Bradley Fighting Vehicles. The Engineer Brigade received the Bradleys on loan from the 49th Armored Division, Texas National Guard, at Fort Hood.

The structure of the combat engineer company was minimally changed with the fielding of the Bradley. The number of personnel assigned to the combat engineer platoon was decreased to match force-structure authorizations in the conservative heavy division's modified table of organization and equipment (MTOE). For example, engineer platoons changed from three to two squads. Bradleys were substituted for the company's M113s. The company commander received a Bradley, and four were assigned to each line platoon—one for the platoon leader, one for the platoon sergeant, and one to each of the two sapper squads.

Two points are worth noting regarding the structure of the Bradley engineer company. First, the engineer Bradley is not called a squad vehicle. It is tentatively called an Engineer Bradley Fighting Vehicle. This name is in keeping with today's offensively oriented doctrine where the engineer platoon, not the squad, is employed as the basic breaching and reduction unit. This is also true of countermobility operations, which focus on emplacing scatterable mines. The engineer platoon sites and marks these obstacles. Second, reducing the engineer platoon from three to two squads was not precipitated by the transition to Bradleys: It is the result of a previously implemented MTOE change.

New Equipment Training

The evaluation began in March 1998 with new equipment training (NET) and culminated in August 1998 with A/588th's participation in National Training Center Rotation 98-10. The Bradley NET team from Fort Benning, Georgia, conducted the training in two phases.

- The first phase included 18 days of training on driving and licensing, maintenance, and turret operation; gunnery skills with a Unit Conduct-of-Fire Trainer (UCOFT); and Multiple Integrated Laser Engagement System (MILES) gunnery.
- The second phase was eight days of Bradley gunnery qualification training: one day of Bradley Gunnery Skills Testing and a UCOFT refresher; one day on Table V; and two days each on Tables VI, VII, and VIII.

No training was conducted on the tube-launched, optically tracked, wire-guided (TOW) missile system since it was determined this is not a weapon system engineers are expected to use to accomplish their mission. Use of the TOW launcher and the type of munitions engineers might employ in the future need further evaluation.



A Bradley vehicle transporting bundles of wire on its trim vane.

The NET was fairly easy for combat engineer soldiers and leaders, who quickly adapted to the new equipment and skills. In addition to the dedicated NET team, the company borrowed other resources to accomplish the training. A qualified Bradley master gunner was needed at both company and battalion levels to train gunnery skills and to plan, prepare, and help execute gunnery qualification. The company also required a dedicated UCOFT to prepare for gunnery training and maintain gunnery skills. For the test period, the unit acquired a master gunner from the Engineer School and a UCOFT from 2d Brigade, 4th Infantry Division.

Between phase I and phase II of the NET, A/588th conducted company/team lanes training with Task Force 1-67 Armor to prepare for the National Training Center. Representatives from the Maneuver Support Battle Lab and the Engineer School were on hand to examine the Bradley's performance. A/588th focused on validating load plans and on the TTPs for conducting missions in offensive and defensive operations. The company took this training a step further by conducting a one-week platoon lanes field training exercise (FTX) to further refine the TTPs needed to execute their mission at the National Training Center.

Preliminary CEP Results

Combat engineer soldiers embrace the Bradley because it provides them speed, mobility, protection, and firepower not possible in an M113. Engineer leaders champion this vehicle because of its versatility and potential. Maneuver forces are advocates of combat engineers in Bradleys because EBFVs can maintain the pace and tempo of maneuver forces and provide enhanced mobility and countermobility support.

Tactics, Techniques, and Procedures

The 588th Engineer Battalion is developing detailed TTPs for the Bradley Engineer Platoon and Engineer Company. Converting from M113s to Bradleys has not generated dramatic changes in TTPs. Most of the TTPs used for operations in M113s translate satisfactorily for operations in Bradleys. In some areas, however, new TTPs are being developed to support enhancements provided by the more survivable and versatile Bradley. Lane-marking and row minefield-emplacement TTPs require minor modifications. Interestingly, we found row minefield emplacement easier and more productive in the Bradley than in the M113.

Mobility

Increased speed, armor, and firepower allow combat engineers to work, maneuver, and protect themselves simultaneously. The turret and main gun of the Bradley are extremely valuable to combat engineers and increase their capability and versatility. Engineers in M113s command and control mobility and countermobility assets, but they rely on maneuver forces to protect them. This reliance often drains the already-stretched firepower of infantry and armor forces. Engineers in Bradleys can better protect themselves during movement and when breaching and reducing obstacles. Thus, the Bradley Engineer Company and Battalion are better suited to perform as a breach force during battalion and brigade deliberate breaches.

The 588th Engineer Battalion also experimented with V-type surface mine plows manufactured by Pearson Engineering. One plow was borrowed from Fort Leonard Wood and three are on loan from the Land Forces Canada. These plows have potential for maintaining mobility of the force en route to an objective. The blades can clear rubble and skim scatterable mines from level, hard-packed surfaces. They plow well in soft soil where adequate spoil can be maintained before the blade. The blade would be even more useful if it floated along its horizontal axis so it could be employed along semilevel surfaces, such as combat trails. The blade currently does not perform well on uneven surfaces or in rocky areas. More experimentation with other blades is required to fully develop this mobility asset.

Countermobility

The Engineer Bradley Fighting Vehicle increases our capability to conduct countermobility operations as well. While the EBFV platoon is capable of conducting conventional mine operations, the focus of the countermobility effort centers on the rapid emplacement of dynamic obstacles. Engineer platoon-, company-, and battalion-sized countermobility organizations can be formed with the capability to operate independently on the battlefield. If these organizations are equipped with EBFVs and scatterable mine systems, they could protect themselves during movement and while emplacing and marking obstacles.

The potential exists for adding other engineer systems to the EBFV. One possibility is to replace the TOW launcher with a weapon system that employs a high-explosive munition similar to the 165-millimeter high-explosive "bunker buster" round on the Combat Engineer Vehicle. An EBFV demolition gun could be used to reduce roadblocks and other obstacles. Another opportunity worth considering is to design and mount a small panel for Volcanos on the EBFV. Each Bradley engineer platoon would then have a rapid scatterable mine capability.

Sustainability

While not directly related to TTPs, but often having a tremendous impact on how we conduct a mission, sustainability is an area where EBFVs are winners. During a two-week company/team lanes FTX, one Bradley was deadlined. An M113 company had six M113s deadlined at various times during the same period. As we adopt the Force XXI centralized logistics support concept and move from supply-based to distribution-based maintenance, an economy of scale is created

through the use of a common chassis. This makes the Bradley more sustainable in the heavy division than M113-type vehicles. Although Bradleys are more expensive to maintain than M113s, the increase in survivability, capability, and sustainability more than justifies the additional cost.

Load Plans

Soldiers from A/588th Engineer Battalion developed standard load plans for the EBFV that facilitate the successful execution of combat engineer missions. Every piece of platoon equipment was examined to determine what an engineer platoon needed in combat. TOW storage racks were removed from the M2A0 Bradley to increase interior space, and the exterior was adapted to carry wire, pickets, and tools. Although Bradleys do not have as much interior space as M113s, the EBFVs can carry the engineer equipment necessary for combat. The EBFV load plans were explored again during National Training Center Rotation 98-10.

A/588th personnel also developed plans to modify the interior and exterior of the Bradley to increase space and utility. Through an agreement with the Bradley project manager and Red River Army Depot, these plans were used to modify an M3A0 Cavalry Fighting Vehicle. Soldiers from A/588th worked with a team at Red River to complete the modifications. Bench seats with storage boxes replaced individual seats, and shelves and cabinet-type storage boxes replaced excess TOW racks and ammunition boxes. Posts were welded on the exterior of the vehicle to carry pickets and lane-marking materials, and the trim vane was used to carry concertina wire. A larger bustle rack also was installed.

These were simple and inexpensive modifications that could be completed within the battalion. M2 Bradleys can be similarly modified to increase space and function. M2 ODS Bradleys (those modified for use in Operation Desert Storm) already have more interior space than earlier M2 models as a result of similar modifications.

Gunnery

Another tremendous success story for the EBFV and combat engineers was gunnery. Confident and motivated engineers conducted Bradley gunnery only six weeks after the vehicle was introduced, and they produced astounding qualification scores. All crews qualified on their first attempt (Q1 rating), with one crew qualifying as "distinguished" and two crews qualifying as "superior." This record is rarely achieved in the division.

Engineers conducted their gunnery according to FM 23-1, *Bradley Gunnery*. A/588th soldiers practiced firing using Tables V, VI, and VII and then qualified on Table VIII. These tables should not be modified for engineers, because engineers encounter the same types of engagements while conducting their missions.

The 588th is also developing a platoon live-fire table for combat engineers. Bradley platoon gunnery for infantry soldiers consists of Table XI, *Platoon Practice*, and Table XII, *Platoon Qualification*. Qualification is based on the platoon's ability to execute collective tasks in a live-fire environment. Similarly, the engineer platoon Table XII focuses on offensive and breaching operations under live-fire conditions. A Bradley engineer Table XII serves as an excellent graduation exercise from platoon lane training and also prepares the engineer company to participate in the maneuver task force Combined Arms Live-Fire Exercise.

Enhancing the Combined Arms Team

The EBFV has made engineers a more valuable part of the combined arms team. It is the platform from which to launch combat engineers into the Army After Next. Inexpensive and simple modifications to the Bradley have alleviated load-plan fears. Plows and other attachments offer advantages for the combined arms team and will enable the engineer force to move from the mechanized to the armored way of warfare. The Bradley provides a more survivable platform for our soldiers. In our experience, gunnery was not a distracter to training. We believe it has potential to improve engineer training by merging gunnery with engineer lane training.

For current Engineer Bradley Fighting Vehicle information and photos, visit the Engineer Brigade, 4th Infantry Division (Mechanized), web site at *http://hood-ivygreen.army.mil/engineer*. Send comments and input to the brigade S3 e-mail address provided on the web site or directly to *tortoran@hood-emh3.army.mil*.

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