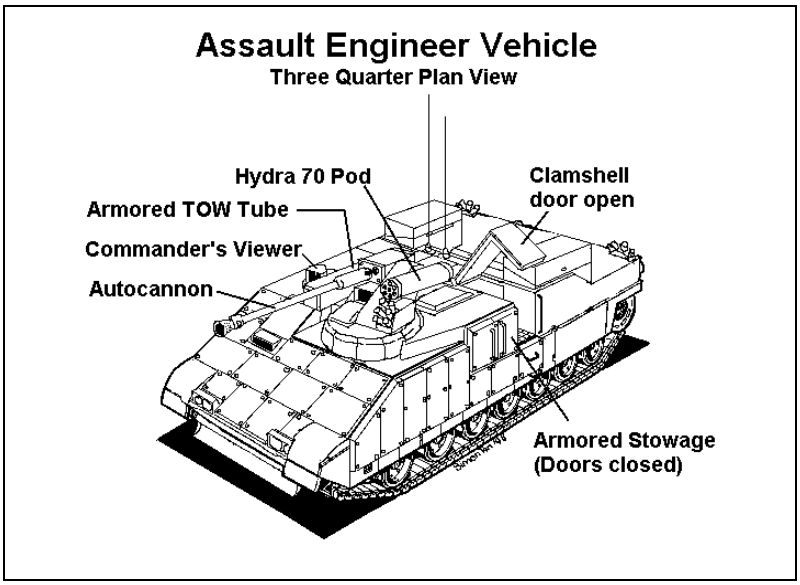
Is the Bradley Heavy Enough to Replace The M113 in Combat Engineer Units?

Author's Proposal Calls for Modifying the M1 Chassis

by Simon Tan



Although it is usually uneconomic to build small numbers of specialized armored vehicles, we thought the author's reasoning and discussion worth including in this issue. – Ed.

Consideration is now being given to mounting combat engineer squads in Bradleys, rather than M113s, but neither the M113 nor the Bradley is adequate for this purpose. A better idea would be to adapt a turretless M1 tank chassis as the basis for a new engineer vehicle.

First, let's examine why the M113 is no longer adequate:

- It is too slow to keep up with Bradleys and M1s.

- It is too thinly armored, and improving that armor would add too much weight.

- It is poorly armed, with only a .50-caliber machine gun, and the operator is exposed to enemy counterfire.

- It is being phased out, creating logistic problems.

In some ways, the Bradley would be an improvement. It has better firepower, more speed, and greater mobility, but it also has major drawbacks:

- There is insufficient internal space to carry a large engineer squad and the many specialized equipment kits they will use.

- To create more space, it would have to jettison its TOW launcher and missile storage.

- Considering the high-threat environment in which engineer squads typically work, there is insufficient armor protection on the Bradley, compared to a tank.

The Soviets and the Israelis have recently developed specialized engineer and infantry fighting vehicles fabricated from tank chassis. The Israeli Achzarit is a troop carrier developed from a T-55 tank chassis. The Israeli Puma engineer vehicle is a converted, turretless Centurion tank. And the Russians have adopted some of their T-55 chassis, removing the turret and adding a new top deck, to create the BTR-T, apparently a reaction to the way lightly armored BMPs were destroyed so easily in the Chechnya fighting.

My proposal is derived from the Israeli experience with the Puma Centurion conversion in particular. This is a specialist assault transporter for their combat engineers. It provides the occupants with MBT protection and mobility. Other heavy APC/IFV developments, such as the Achzarit and BTR-T, have also emerged. These vehicles can be described as assault transports intended to deliver their occupants into a high threat situation.

I believe a similar vehicle would be a significant addition to the combat engineering capabilities of the Army.

The Vehicle

We shall call this proposal the AEV or Assault Engineer Vehicle. It will be based on the M1 Abrams and be converted from surplus stock. This reduces both the cost and gestation period of the project. The conversion would involve:

- Cutting away the turret ring and building up a low, heavily armored (MBT standard) superstructure for the crew compartment. The M1 should be able to comfortably carry a six-man dismount section. Ingress and egress to the troop compartment will be via roof hatches and a side clamshell door on either side of the troop compartment. The latter would be used under fire as it avoids dismounting over the top. A rear-facing clamshell arrangement, as on the Achzarit, is unnecessarily complicated.

- Stowage of bulky equipment would be in external armored bins fitted along the side of the superstructure. This eliminates the need to handle the equipment in and out of the troop compartment. It also doubles as spaced armor.

- Fitting a low-profile, one-man turret with an auto-cannon like the M242 Bushmaster or equivalent to the front left corner of this superstructure. A two-man turret will simply take up more space within the fighting compartment and increase weight. A turret such as the one found on the Marder would be ideal as it reduces the exposure of the gunner.

- The commander will be equipped with independent panoramic sight with thermal channel.

A single tube TOW launcher would also be fitted on the side of the turret. This is intended to fire "DEMO-TOW," a demo-

lition/anti-materiel variant of the TOW family. Using surplus TOW and ITOW guidance and propulsion units, this weapon will have a 6-inch diameter warhead comprising a reinforced penetrator cap, a fuel-air explosive (FAE) warhead module, and a high-impulse rocket motor. The weapon is intended to have two operating modes, impact and delayed. In the first mode, the missile explodes upon impact, this being used for attacking unprotected structures. In the second mode, the rocket motor will ignite before impact and propel the warhead into the target. Operation is not unlike a runway cratering weapon. Penetration should be at least 12 inches of reinforced concrete. The weapon would then explode inside the structure.

The weapon should also be very effective against a wide variety of targets. Warhead weight can be quite high as the weapon does not need to exploit the full 3,750m range of TOW. A 2,000m range should be quite sufficient. Conventional HE payload can be substituted if FAE is not considered politically feasible.

The AEV would carry 6 rounds for the launcher and would normally consist of five DEMO-TOW and one TOW 2A/B for self-defense. Reloading would be from under armor, using a roof hatch as on a Bradley.

Roof-mounted, remotely operated machine guns, such as those on Israeli armored vehicles, could be fitted for extra firepower. The crew would consist of a driver, gunner, and vehicle commander.

Some additional features that could be added include:

- A dozer blade at the front of the vehicle. This would be retractable and have full width extensions. Mine plows could be fitted.

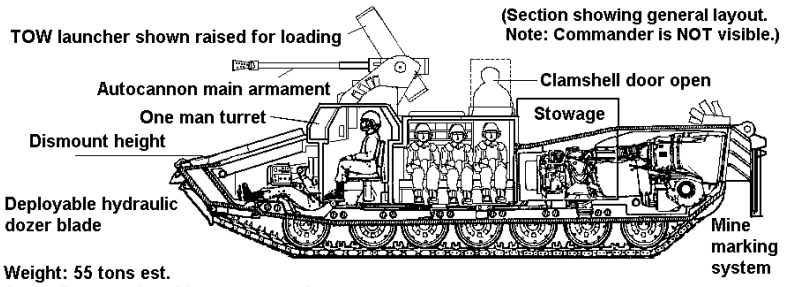
- IRA/VRA armor arrays could be added to improve survivability. ERA would be unsuitable as it poses a hazard to the dismounts.

- Additional smoke dischargers could be attached at the hull rear as well as the turret. Obscuration during dismount will be important and the number of dischargers should exceed 16. Additionally these dischargers could be loaded with APERS munitions for MOUT operations.

- There could be mounting points on the rear deck for line charge/FAE launchers to clear minefields.

- An automatic minefield marking system installed on hull rear edges could perform like the system on the minefield-marking BRDMs.

Armored Engineer Vehicle (AEV)



Weight: 55 tons est.
Crew: Commander, driver gunner + 6
Armament: 25mm + autocannon (300 rounds)
7.62mm Coax MG (3000 rounds)
TOW launcher (7 rounds)

Automotive: as per M1 series
Notes: Commander equipped w/ independent thermal viewer

- There should be provision for carrying fascines on the rear deck and sides.

- Adding a towing pintle for an armored trailer would permit carrying extra engineering stores. It should be capable of remote jettison from the fighting compartment.

Comparisons

Even with all the modifications, the vehicle should still weigh less than a full M1 and be able to use Class 70 bridges and equipment. It would have better mobility than the Bradley, and much better armor protection. It should have survivability equal to or better than the M1, and armament as good as or better than the Bradley. With its dozer blade, plows, fascines, and explosive mine-clearing capability, it would be versatile in breaching situations. The vehicle would be capable of integral mine marking. And there would be plenty of space for external armored stowage.

Organization

The conversion of 60 vehicles would be adequate to form a special Armored Assault Engineer Battalion. It would be composed of four Armored Assault Engineer Companies, each with three platoons of four vehicles and two in the HQ section. Four would be held as reserve in battalion. Regular armored engineers would cross train in the use of this equipment. Drivers, gunners and commanders would be organic to the battalion but the dismounts would not be. Companies could be attached to brigades as required, rather than being organic to their structures. They should be considered at least a corps asset. Companies should be committed together. Piecemeal use should be discouraged. Units would always work in cooperation with other arms, not alone as assault infantry. Support companies will be required to support deployments. These should include mechanics and resupply elements. Finally, this vehicle would be an excellent adjunct to the Grizzly ACEV.

Costs

The basis of the unit would be 60 used M1 hulls, which are paid for. Equipment and conversion should cost no more than $1.5-2 million per unit by conservative estimate.

To create DEMO-TOW missiles, we could use TOW propulsion units available for remanufacturing, which should reduce costs. The warheads would have to be created. A rough estimate is that these missiles would cost under $25,000 per unit, and they would have a wide range of applications beyond AEV.

Time Frame

Using fast track management and revised bidding, I would expect a working prototype by 2001 and IOC by 2003-4 at the latest. The project should be a requirement, not contractor-driven. Ultimately, this would be a low-risk development with short gestation to provide a significant enhancement to combat engineers at a reasonable price.

Simon Tan trained at the University of Edinburgh from 1991-1997 as an architect. He intends to pursue a further academic career in military science in the future. He has always had a keen interest in military subjects, in particular armor. His major areas of focus are armored tactics and doctrine from WWII to the present, with particular interest in battalion/brigade operations and wider operational issues.