

# Transforming to Armored Combat-Engineer Company: Purpose-Built Solution for Armored Force in Large-Scale Combat Operations

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*It is 4:22 a.m. at the National Training Center (NTC) and 87<sup>th</sup> Sapper Company is breaching a complex mine-wire obstacle in Brown Pass. The 3<sup>rd</sup> Cavalry Regiment is in attack positions just north of Hill 910, ready to assault through the pass and on toward its objective near Crash Hill. The 87<sup>th</sup> Sapper uses its M113 Armored Personnel Carriers (APCs), equipped with .50-caliber machineguns and towing mine-clearing explosive-line charge (MICLIC) trailers, to approach and breach a lane through the obstacle belt. As it moves to secure the far side of the breach, 87<sup>th</sup> encounters a company of boyeva mashina pekhoty (BMP-3) Russian fighting vehicles approaching from inter-visibility lines in the west. The BMP-3s effectively scoff at the Sapper M113s, and they quickly shred the engineer formation and reoccupy Brown Pass – spoiling 3<sup>rd</sup> Cavalry’s attack on Crash Hill.*

For engineers, this scenario is as familiar as it is frustrating. The “Brown Pass” is a complex piece of terrain, but even with 87<sup>th</sup> executing a technically correct breach, it could not open a lane due to the inferiority of its equipment and the obvious gaps in its force structure. The U.S. Army Engineer Regiment recognizes the limitations of its mechanized formations and has recently developed a solution: the combat-engineer company-armored (CEC-A).

## Transformation effort

The engineer regiment is in the process of modernizing combat-engineer formations – moving away from older maneuver-augmentation companies (MAC) and sapper companies toward the more capable and modern CEC-A.<sup>1</sup> The new formation brings significant engineer capability into the fight, but the pace of transformation across the regiment has been slow.

The 36<sup>th</sup> Engineer Brigade, III Armored Corps, headquartered at Fort Hood,

TX, has multiple companies at various stages of this transformation effort, and it’s uniquely positioned to observe and analyze the performance of different company designs. Through that experience, 36<sup>th</sup> Engineer Brigade concludes that the modern CEC-A represents a tailor-made solution for the armored force in large-scale combat operations (LSCO) as it offers the lethality and robust engineer capability the fight demands. We also advise that maneuver commanders energize the process of transformation because seizing the training and equipping initiative will better enable fighting with these new engineer formations in the near future.

## Engineer-company structures

There are several engineer formations that currently support armored units: Alpha and Bravo Companies within the brigade engineer battalions (BEBs), MACs, sapper companies and the newly forming CEC-A companies are housed within engineer brigades. The CEC-A structure currently includes both a legacy build sourced with “in-lieu of” platforms<sup>2</sup> and the fully outfitted modern CEC-A (Figure 2).

- The BEB companies are M2A3 Bradley Fighting Vehicle-based formations with Assault Breacher Vehicles (ABVs), Joint Assault Bridges (JABs) and D7 bulldozers. MAC and sapper companies are equipped with M113s, towed MICLIC trailers and the M60 chassis-based Armored Vehicle Launched Bridges (AVLBs).
- The legacy CEC-A is a partially sourced formation that adds D6 bulldozers and M136 Volcano minelaying systems to the MAC/sapper formations.
- The fully modern CEC-A is equipped M2A3 Bradleys, ABVs, JABs, D7 dozers and Volcano systems. CEC-A offers a similar package as the Company A in a BEB but with more



Figure 1. An 87<sup>th</sup> Sapper M113 APC tows a MICLIC trailer at NTC, Fort Irwin, CA. (U.S. Army photo)

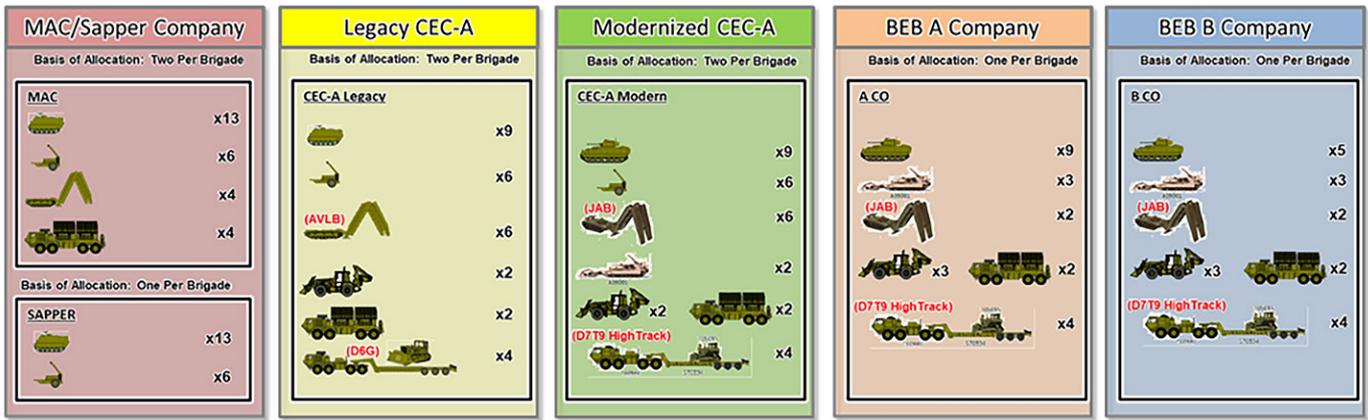


Figure 2. Engineer-company comparison of key equipment.

sapper dismounts and a greater number of engineer platforms.

When it comes to supporting the armored fight, the effectiveness of these formations can vary widely, but the BEB and modern CEC-A companies provide the rawest engineer capability.

## Integration with armored force

The 59<sup>th</sup> MAC and 87<sup>th</sup> Sapper Company, both with 36<sup>th</sup> Engineer Brigade, were among the first companies across the Army to begin CEC-A transformation. The 59<sup>th</sup> was structured as a modernized CEC-A, and 87<sup>th</sup> as a legacy CEC-A. Both recently participated in NTC rotations supporting 2<sup>nd</sup> Armored Brigade Combat Team (ABCT) of 1<sup>st</sup> Cavalry Division and 3<sup>rd</sup> Cavalry Regiment respectively in Spring 2022. With these rotations as a basis for comparison, when compared with the MAC and sapper companies, the CEC-A better integrates with maneuver forces and provides the requisite lethality to be a contributing member of the team.

The armored fight demands speed, audacity and a vigilant maintenance of the initiative. The modern CEC-A can support that demand from armored maneuver forces in a way the older designs cannot. In its rotation with 2<sup>nd</sup> ABCT, 1<sup>st</sup> Cavalry Division, 59<sup>th</sup> CEC-A was able to keep pace and maneuver alongside the combined-arms battalions without any interruption to the operational tempo, and the unit's M2A3 Bradleys provided welcome combat power and security to 2<sup>nd</sup> ABCT, 1<sup>st</sup> Cavalry Division.

In contrast, 87<sup>th</sup> Sapper struggled to keep up with 3<sup>rd</sup> Cavalry Regiment during NTC 22-07, as its M113s were significantly slower and less capable than the armored force demanded. An M113 APC towing a MICLIC trailer is only capable of traveling at 15 kilometers an hour off-road, which falls well short of the 31 kilometers an hour of an M2A3 Bradley or the 40 kilometers an hour of an M1 Abrams main battle tank.

In addition to speed, the lethality of the Bradley vs. the M113 further points toward the superiority of the modern CEC-A. An M113 is equipped with an unstabilized M2 .50-caliber machinegun, which is of little use in a mechanized conflict. During NTC 22-07, 3<sup>rd</sup> Cavalry had to leverage more maneuver assets to secure 87<sup>th</sup> Sapper as it moved around the battlefield to prevent loss of the high-value engineer targets.

In contrast, the M2A3-equipped 59<sup>th</sup> CEC-A had 25mm Bushmasters, modern optics and tube-launched, optically tracked, wire-guided missiles, which enabled it to move freely around the battlefield and represented more combat power for 2<sup>nd</sup> ABCT, 1<sup>st</sup> Cavalry Division, to employ.

These examples support the claim that the CEC-A

design represents an improvement over the older formation designs.

A direct comparison of companies is also instructive when assessing the potential lethality of each formation design. Figure 3 highlights the potential lethality values of each engineer-company type as it relates to a brigade allocation. For example, current ABCTs include both companies A and B from the BEB, and, as such, two CEC-As are expected to be allocated to each redesigned armored brigade. Reviewing the figure, the modern CEC-A and BEB designs provide equivalent maneuverability and Javelin values, but the CEC-A includes another M2A3 Bradley platoon of combat power.<sup>3</sup> It is also apparent that the sapper and legacy formations bring a less-effective combat formation to the armored fight.

## Engineer capabilities provided to armored force

During LSCO, engineers are typically

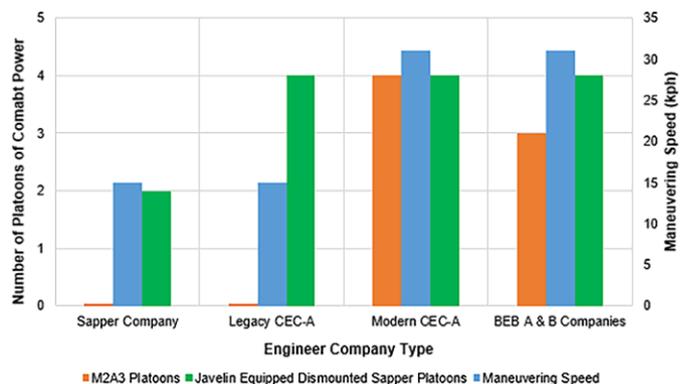


Figure 3. A lethality comparison of engineer-company designs based on brigade allocation. The BEB and CEC-A build provide significant value, with a slight advantage toward the CEC-A based on the additional M2A3 platoon.

tasked to provide mobility, counter-mobility and survivability support to the armored force.<sup>4</sup> This manifests as support to the breaching, obstacle emplacement and protection efforts of the supported unit. When comparing the effectiveness of 87<sup>th</sup> Sapper and 59<sup>th</sup> CEC-A during their rotations, the preferred formation becomes obvious.

Focusing first on mobility, during NTC 22-06, 59<sup>th</sup> CEC-A self-secured and breached a complex obstacle belt in Whale Gap, demonstrating the flexibility and capability of its formation. As the breach-force commander, 59<sup>th</sup> CEC-A reduced, proofed and marked a lane through a mine-wire obstacle with an ABV-launched MICLIC and crossed an anti-vehicular ditch using its JAB. As the assault force was passed, the minefield was reseeded by enemy artillery, and the ABV was able to quickly pivot and reopen the lane with its second MICLIC, maintaining momentum through the breach for 2<sup>nd</sup> ABCT, 1<sup>st</sup> Cavalry Division.

This would have been impossible for the M113-based 87<sup>th</sup> Sapper. Its single-shot, towed MICLIC trailers with limited proofing and marking capability would have halted all forward movement in the breach. The 3<sup>rd</sup> Cavalry identified these weaknesses during its rotation and subsequently struggled to employ 87<sup>th</sup> Sapper effectively during breaching operations. The slower speed, additional security requirements and limited breaching capability injected more complexity into an already challenging operation. As a

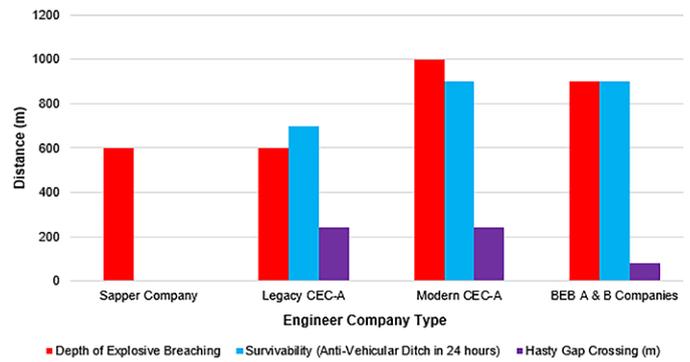


**Figure 4. A 59<sup>th</sup> CEC-A ABV proofs a lane during NTC 22-06 with 2<sup>nd</sup> ABCT, 1<sup>st</sup> Cavalry Division. (U.S. Army photo)**

result of this and other factors, 3<sup>rd</sup> Cavalry's breaching efforts were not successful during the rotation, and valuable momentum was lost during offensive operations.

In terms of counter-mobility and survivability capabilities, the modernized CEC-A has obvious advantages in terms of its equipment and structure that translate into operational advantages for the maneuver force. The CEC-A is equipped with D7 bulldozers that yield 30 percent more obstacle and survivability effort as compared to their older D6 bulldozer counterparts.<sup>5</sup> This, coupled with the direct-fire overwatch of the M2A3 Bradleys during obstacle construction, allowed maneuver commanders to concentrate efforts on the deep fight during defensive operations.

During NTC 22-06 with 2<sup>nd</sup> ABCT, 1<sup>st</sup> Cavalry Division, 59<sup>th</sup> CEC-A was able to self-secure and complete all planned obstacle efforts in the central corridor, whereas 87<sup>th</sup> Sapper was not able to meet 3<sup>rd</sup> Cavalry's planned obstacle requirements during NTC 22-07. Therefore, 3<sup>rd</sup> Cavalry struggled to allocate the necessary security forces to the 87<sup>th</sup> during its obstacle construction efforts. As a result, disruption efforts by enemy forces prevented the



**Figure 5. Engineer-capability comparison of engineer-company designs based on brigade allocation. The modern CEC-A provides the most value based on these metrics.**

work from being completed before defend time.

The lesson is that the equipping and manning advantages the modern CEC-A has over the older formation are apparent, and these advantages have powerful secondary effects on the maneuver fight.

Reviewing the

equipment within each formation also provides some ability to assess the value each set contributes to a supported brigade. Figure 5 describes the distances in explosive breaching, anti-vehicular ditch construction and hasty gap crossing<sup>6</sup> each formation type provides. Reviewing this graphic, legacy CEC-As offer increased value over the sapper formation, but both lag significantly behind the BEB and CEC-A structure.

The CEC-A provides greater hasty gap-crossing capability based on more JAB platforms and greater explosive breaching capability as it possesses MICLIC trailers in addition to its ABVs. However, the BEB does possess two more ABVs than the CEC-As, so it contributes greater kinetic and rapid breaching capability. When comparing the practical performance of these companies and reviewing the capabilities of their formations, it's clear the CEC-A formation lends most value to the armored brigade.

## Energizing transformation

In the near-term, assessing the effectiveness of different engineer-company designs is useful because it allows us to identify capability gaps and develop a more complete understanding of how to fight various engineer formations. In the long-term, it should help convey the point that the CEC-A represents the preferred design, and we need to accelerate the current pace of transformation to get to that structure as quickly as possible.

The 36<sup>th</sup> Engineer Brigade is in the early stages of this modernization effort,

with only a few fully equipped CEC-As and a limited number of other companies actively transforming. Recently the pace of modernization has slowed dramatically as equipment and funding are routed to worthy pursuits elsewhere. That said, there are sourcing opportunities and funding solutions that could do with the endorsement of maneuver commanders and the Armor Branch.

This modernization effort occurring within the engineer regiment is in response to the pending updates to the Army force structure and is ultimately in line with a return to a more division-centric force.<sup>7</sup> We petition maneuver commanders at echelon to look for opportunities to help facilitate the modernization of engineer companies toward CEC-A formations because it will directly benefit the performance of their formations.

The 36<sup>th</sup> Engineer Brigade has seen firsthand the difficulty in equipping and retraining these companies from a standing start. Sourcing units with “in-lieu of” equipment, struggling to train Soldiers on new platforms and fundamentally changing the identity of a company has proved non-trivial. We expect that these transformations will occur under the current force organization, but we do see risks as world events could prompt a more rapid shift. We advise maneuver commanders to lean forward into developing habitual training relationships with newly forming companies and support them in outfitting their units. We believe these efforts will lead to a more lethal armored force, with the new engineer companies better suited to support maneuver in their missions.

## Conclusion

After evaluating the performance of various engineer-company formations, it's apparent the modern CEC-A provides significant value to the armored force. While fully transforming an older formation into a modern CEC-A may seem costly in the near-term, it should be viewed as an investment in the future of the armored formation.

The modern CEC-A represents a purpose-built solution for supporting an armored force during LSCO. It's a faster and more lethal design, capable of

delivering greater engineer effort more consistently to the armored force. This makes it the engineer company of choice for maneuver commanders. We again advise maneuver leaders to energize the transformation and modernization of engineer companies as opportunities arise. Seize the initiative and aggressively build out these enabling formations as they provide invaluable capability and enable the violence of action that we demand in an armored attack – especially considering the state of world affairs.

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*1LT Catherine Lynch is a tactical officer, 20<sup>th</sup> Engineer Battalion, Fort Hood. Previous assignments include executive officer, 59<sup>th</sup> Combat Engineer*

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MAJ Paul Wyatt Jr. is the brigade operations officer, 36<sup>th</sup> Engineer Brigade. Previous assignments include operations officer, Regimental Engineer Squadron (RES), 3<sup>rd</sup> Cavalry Regiment, Fort Hood; executive officer, RES, 3<sup>rd</sup> Cavalry Regiment; and commander, Company B, 8<sup>th</sup> Engineer Battalion, 2<sup>nd</sup> ABCT, 1<sup>st</sup> Cavalry Division, Fort Hood. MAJ Wyatt has a bachelor's of science degree in economics from USMA, a master's of arts degree in business administration from Webster University and a master's of science degree in

systems engineering from the University of Texas at Dallas.

## Notes

<sup>1</sup> Modified table of organization and equipment, 59<sup>th</sup> Combat Engineer Company, February 2022.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> Army Techniques Publication (ATP) 3-90.4, **Combined-Arms Mobility**, June 2022.

<sup>5</sup> ATP 3-90.8, **Combined-Arms Counter-mobility**, November 2021.

<sup>6</sup> ATP 3-90.4, **Combined-Arms Mobility**, June 2022.

<sup>7</sup> LTG Theodore Martin, U.S. Army Combined Arms Center, "Waypoint in 2028 – Multidomain Operations," December 2021. <https://www.youtube.com/watch?v=OUZp01Cjdil>.

## ACRONYM QUICK-SCAN

**ABCT** – armored brigade combat team  
**ABV** – Assault Breacher Vehicle  
**APC** – armored personnel carrier  
**ATP** – Army techniques publication  
**AVLB** – Armored Vehicle Launched Bridge  
**BEB** – brigade engineer battalion  
**BMP** – *boyeva mashina pekhoty* (Russian fighting vehicle)  
**CEC-A** – combat-engineer company-armored  
**IBCT** – infantry brigade combat team  
**JAB** – Joint Assault Bridge operations  
**LSCO** – large-scale combat operations  
**MAC** – maneuver-augmentation company  
**MICLIC** – mine-clearing explosive-line charge  
**NTC** – National Training Center  
**RES** – regimental engineer squadron  
**USMA** – U.S. Military Academy (West Point)

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