The Marine Combat Engineer Regiment

A better organizational model for combat engineers

by LtCol Walt Carr

Engineers are scarce. The Marine Corps has historically never had enough combat engineer support to go around, or at least it seems that way. This is a popularly held belief in the fleet, but are engineers really scarce or do we just mismanage them?

Marine combat engineers are combat multipliers postured across the Fleet Marine Force (FMF) with formations in the Marine division, the Marine logistics group, and the MAW. The preponderance of Marine combat engineer capability is intended to enable maneuver in support of operations, with only an extremely limited general engineering capability. Organizationally, however, the Marine Corps aligns combat engineers primarily with the warfighting function of logistics on the basis that general engineering is a sub-function of logistics. This engineer alignment with logistics has led to mismanagement of combat engineers in our staffs and across the force, fracturing the community, underutilizing equipment, and diluting the effectiveness of our engineers. In the same way we consolidate aviation platforms for maintenance and training and then task organize for the mission, we must recapitalize our engineers from their isolated positions across the FMF and consolidate them to build a robust engineer regiment poised to provide mobility, counter-mobility, survivability, and, yes, general engineering to the entire FMF. Future concepts, like *Littoral Operations in Contested Environments* (LOCE) (Washington, DC: HQMC, 2017), *Expeditionary Advanced Base Operations* (EABO) (Washington, DC: HQMC, 2018), and *Distributed Maritime Operations* (DMO) (Washington, DC: 2018) will require even more combat engineer support to become a reality. These concepts demand a more agile, lethal, and *resilient* force. To be truly resilient, we must not only seek to avoid being targeted; we must be able to absorb hits and remain operational. The force must disaggregate across a wide area but will still need to be able to quickly task organize and mass at the right place and time. In order to survive an environment of long-range precision fires, asymmetric threats, and irregular warfare, we must become experts in deception, camouflage, underground fortification, and signature management—all areas in which engineers can be used to great effect (see Figure 1). Combat engineers will be an ever more vital component of the force in the future and needs to be managed as such. When faced with any scarce resource, the wisest thing to do is to manage it carefully with centralized command and decentralized execution. Therefore, the best way to manage scarce engineer resources is through consolidation and centralized command, enabling efficiencies in organizing, manning, training, and equipping, leading to combat engineer formations that are prepared to properly support the needs of the future FMF.

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Engineers in Support of EABO and LOCE

The ideas presented in the 2018 *National Defense Strategy* signal a fundamental shift in the strategy of the United States in the Pacific from deterring a potential aggressor with the threat of

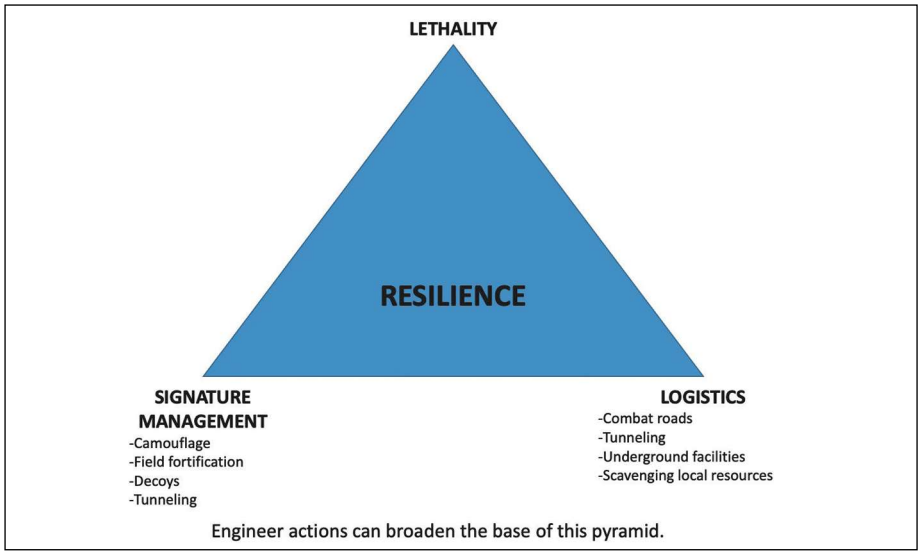

Figure 1. Attributes required for EABO.

punishment to a strategy of deterrence by denial. This means that the U.S. military must be in position along the strategically decisive first island chain in order to deny the adversary the conditions required to obtain their objectives in the first place, rather than relying on the fear of overwhelming American retaliation. Therefore, long before any hostilities have occurred, there must be credible American combat units prepositioned forward, well within the range of threat weapons. They will operate in difficult terrain, in a part of the world long plagued with lingering insurgencies and violent extremist organizations, and they must endure the ancient and perennial dangers of disease and exposure that living and operating in a tropical jungle environment entails. Recent events in Iraq and Afghanistan have shown that large, concentrated bases and staging areas are increasingly vulnerable to attack, not only by long-range missiles and rockets but also by ground assault and irregular forces. The adversaries we face in U.S. Central Command do not hold a candle to the capacity and capability of the Chinese—so how can this work?

I have heard many ideas on how such a stand-in force should operate. Most center on the idea of continuous movement and having no permanent or semi-permanent sites whatsoever, but my experience as a combat engineer tells me that this is complete folly. In a modern environment against a foe that often outpaces us in technology, it is irrational to think we can escape detection, though we should make it as difficult as possible. We will be located, and in an age of precision weapons, that means we will be hit. It is also foolish to think that Marines (or machines) can live, operate, and remain mission ready for more than a few weeks in a harsh environment without shelter and proper hygiene. But there is another inexpensive, low-tech way to survive besides just reducing signatures. History provides numerous examples of how to endure and evade the firepower and surveillance of a technologically and numerically superior foe. Just ask the Viet Cong, the Japanese defenders at Iwo Jima, Hamas in Israel, or our more recent adversaries in Afghanistan and Iraq. They all went underground to avoid detection and annihilation by long-range firepower.

Imagine a distributed network of dozens of small bases constructed by Navy Seabees and Marine engineers, all underground and heavily fortified, each capable of housing a unit of 100-300 Marines and their equipment. More will be constructed than are needed, enabling units to constantly relocate and deceive the enemy, making it difficult to identify which are manned and which are only decoys. Each base can support a myriad of possible force packages and logistics packages, both manned and robotic. Each of these advanced bases will have multiple entrance tunnels leading to improved roads and bridges capable of supporting the rapid movement of ground equipment from position to position. Scattered around each base will be dozens more prepared locations (leveled and cleared by combat engineers and Seabees)—suitable as a firing point for a mobile missile battery equipped with a long-range anti-ship or anti-aircraft missile, a landing zone, a forward arming and refueling point, a mobile radar location, or for a remote communications burst transmitter—all also connected by suitable roads. Such a network would be very difficult and prohibitively expensive for an enemy to neutralize with long-range weapons, and it would also be difficult to attack by ground assault. The force would be protected from the weather and from observation. This tactic gives the force true resilience and, when coupled with long-range precision weapons and loitering munitions, the ability to control the surrounding ocean. This is what will be required to make the EABO concept a reality. As Lord Admiral Horatio Nelson said long ago, "A ship is a fool to fight a fort."

Using new and emerging technologies, such as additive manufacturing and modern tunneling and mining equipment, alongside lower-tech methods using foraged local materials like rammed earth construction, our engineers could rapidly construct this "fort" during the competition phase. Using new swarming drone technology, the roads, firing points, and shoreline could all be continuously swept for mines or improvised explosive devices, and cleared with semi-autonomous mine countermeasures equipment to assure our mobility. New fuel testing and additive capabilities could make it possible to forage local fuels while advances in alternative energy, electrical power management, and battery storage could greatly reduce both our physical signature and the need for conventional fuels. New capabilities in soil stabilization and greater integration with the Naval Construction Force would allow us to rapidly prepare landing areas for modern and future military aircraft and create multi-use sites in terrain that would otherwise be unsuitable. These capabilities and more are called for in the recently signed *Marine Corps Functional Concept for Fleet Marine Force Engineering* (Washington, DC: HQMC, January 2020).

But we are not there yet. The engineer functional concept states the fundamental problem in this way:

> The current and future threat dictates the need for dispersed naval formations that can operate and persist within an adversary's weapons engagement zone. This shift of assured control requires a different approach to how engineering is incorporated in the Fleet fight. Current engineer force organization, capabilities, and capacities impede the ability of the FMF to achieve combat-credibility ... Engineering spans all elements of the FMF with a non-optimized ability to centrally coordinate, prioritize, or mass limited assets critical to enabling FMF maneuver. Integrated engineering remains a challenge due to our myopic focus on supporting individual elements of the MAGTF.

In short, we need to redesign Marine Corps engineering completely.

The Way Forward

The first thing we need to establish is a MEF staff capable of controlling, managing, and prioritizing engineer effort. Currently, the Marine Corps organizes the MEF combat engineer staff within the G-4 section rather than the G-3. This has long been a problem because it is the G-3 and not the G-4

that plans, task organizes, and ultimately assigns tasks to units. Typically, the combat engineers are under-represented during G-3 operational planning because they are distracted by their G-4 priorities of facility management, material handling, and other duties. This lack of expert engineer advice in the initial stages of planning often results in unclear task statements to engineer units that are at odds with their capabilities (example: an engineer support company being tasked with route repair) and wasteful methods of task organizing. The most common wasteful task organization method is what I refer to as the "soccer mom method," where every kid gets one juice box and one orange slice, no matter what position he played or how long he was on the field. In the same way, we too often give an equal slice of engineer capability to all units, regardless of their expected missions. There is no room for "weighting the main effort" in the soccer mom method, but it does give an uninformed planner the warm feeling that all his bases are covered. The illogical tendency to attempt to task organize in advance of mission analysis is in no way restricted to engineers. But for engineers it is endemic, and it usually results in great difficulties when there is a need to mass engineers for an important mission—as by this time the lion's share of combat engineers is already doled out as attachments to other units with no real way to be massed or to be mutually supportive. This could be mitigated with the simple step of placing the MEF engineer in the G-3. Facilities management would be better accomplished by a Navy civil engineer officer in any case, as they are trained in this (Marine combat engineer officers are not) and are typically already present within the MEF staff. This simple shift would serve to improve awareness during early planning phases about engineer/mobility issues that will affect maneuver, facilitate intelligent tasking of engineer units within their capabilities, and will allow prioritizing engineer actions in a way more in line with the commander's priorities.

The next thing we need to accomplish is to consolidate engineers as much as possible. The current laydown places completely independent formations in each arm of the MAGTF, with a combat engineer battalion (CEB) in each division, an engineer support battalion (ESB) within the Marine logistic groups, and Marine wing support groups within the MAWs. This organizational construct is predicated on the idea of having smaller, focused engineer formations in direct support within the division and the wing, and that the ESB within the logistics group will provide general support across the MAGTF, reinforcing the CEB or the Marine wing support groups as required. In practice, however, this support relationship has led to a misunderstanding of the capabilities, roles, and responsibilities of the CEB, ESB, and MWSS. Over time, there has risen the mistaken belief that the ESB provides only general engineering (construction, bulk liquids handling, and explosive ordnance disposal [EOD]) functions and that the CEB provides all close combat support. This often causes the underutilization of the combat engineer companies in the ESB and an overtasking of the combat engineer companies within the CEB.

An example of this can be found in my personal experience as a company commander. I was the CO, B Company, 8th ESB during a deployment to Operation IRAQI FREEDOM in 2007. Our company was attached to Combat Logistics Battalion 6 (CLB-6) in direct support of the 6th Marines in Fallujah. During this deployment, despite all of the mission statements to the contrary, and despite being organized for construction (even our manning document listed the Marines' billets as "construction engineer," a MOS that does not exist in the Marine Corps), we did combat engineering exclusively. It is the situation that matters, not the arm of the MAGTF an engineer unit originates from. When placed in direct support of a ground maneuver unit, a combat engineer unit will, of course, take on the missions the supported unit requires. In our case, we did survivability, counter-mobility, and mobility missions in close coordination with the supported regiment (the identical mission of the engineer company from the CEB). Sometimes, my Marines used construction tools to accomplish this, such as building a combat outpost or a checkpoint or a bridge. Sometimes we used explosives to destroy bridges, blow up culverts, or demolish buildings. In no case would what we were performing be considered "general engineering" or logistics. Meanwhile, C Company, 2d CEB was attached to the regiment, was given the same mission statement, and was severely over-stretched and task-saturated—with almost all of its Marines and equipment scattered into separate attachments to the infantry battalions or formed into route clearance teams, with no way to mass enough engineers or equipment at any one site to be effective. Because of our proximity, our two companies were able to coordinate and accomplish our missions, but the situation was much worse than it needed to be.

The separation of the engineer formations (ESB, MWSS, and CEB) from each other by three separate general of-

ficer staffs makes mutual support and task organization more difficult and time consuming than it should be. Simple support tasks usually require official message traffic and other bureaucratic processes, leading to longer spans of time required between a request for support and that support being provided. This lack of responsiveness leads to a mistrust of the system, causing commanders to doubt that the support they require will always be available, which in turn leads to a growth of heavy equipment capacity in each of the formations. Every five to ten years, this results in a mandate from higher headquarters to "lighten the CEB" by reducing the amount of material handling, earth moving, and other heavy engineer equipment from the CEB, which we do—but we never address the root problems that led us to add excess equipment in the beginning. Furthermore, because the overall engineer requirement of the entire MAGTF is so disjointed and spread out, we actually have very little data to inform us exactly how much heavy equipment we need, and allowances are determined primarily by whatever it has been in the past. Correcting this fundamental issue could result in great efficiency gains in the overall amount of engineer equipment required for a mission.

In addition, the sheer size of the engineer battalions is problematic. The two active duty combat engineer battalions each have more than 1,000 Marines, and the three engineer support battalions number roughly 1,500 Marines each. They also conduct a very wide swath of disparate missions, including military bridges, mechanized breaching, bulk fuel support, water production, route clearance, EOD, earthmoving operations, material handling equipment support, and mobile electric power generation to name a few. It is why we often describe the job of the combat engineer as "a mile wide and an inch deep." This span of control and possible missions is beyond that normally expected of a single lieutenant colonel and a battalion staff and is far from ideal. There are also two Marine wing support groups overseeing eight Marine wing support squadrons on active duty, each with approximately 530 Marines. These squadrons conduct the additional missions of engineer support to air operations, including airfield material handling, aircraft refueling, firefighting/rescue, aircraft recovery, airfield lighting, and other expeditionary airfield support tasks.

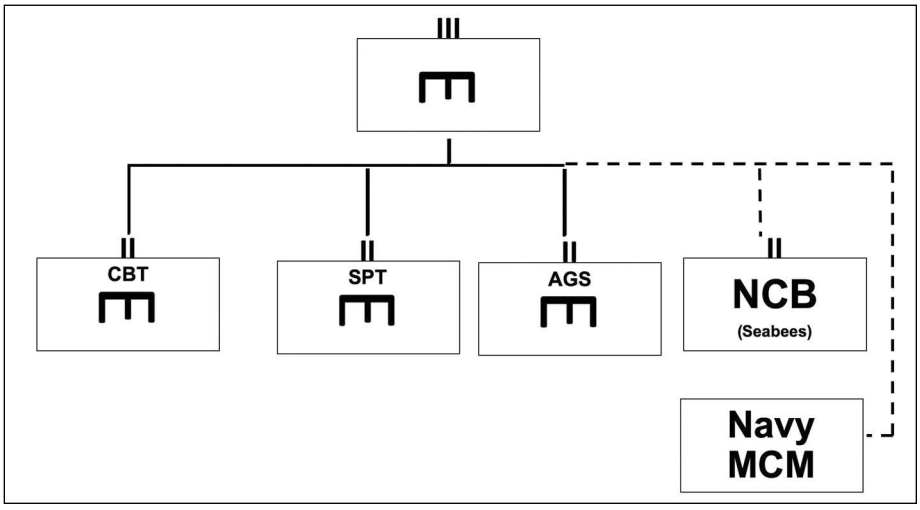

Figure 2. Engineer regiment.

These challenges will require a more drastic measure to remedy, one that makes fully integrated Marine and Naval engineering possible while simultaneously reducing our footprint. We need to completely restructure our organizational model and create engineer regiments at each MEF.

The Engineer Regiment

The Marine engineer regiment is not a new idea. In World War II, each division was supported by an engineer regiment composed of a combat engineer battalion, a pioneer battalion, and an attached naval construction battalion (U.S. Navy Seabees). Back then, the regiment was located within the division, but that was before the current MAGTF construct. In our current model, it is of less importance where the regiment is located—the main goal is to centralize the command and control of engineers across the MAGTF. In the idea put forth here, I have envisioned the regiment as a part of each MEF headquarters, though others have argued it should be in the Marine logistics group or within the Marine division.

Regardless of which major subordinate element of the MEF it falls within, the regiment should include all combat engineer and general engineer functions required by the MAGTF, including aviation ground support (AGS). The regiment would be made up of four battalions: a combat engineer battalion, an engineer support battalion, an aviation ground support battalion, and a naval mobile construction battalion (when attached). This construct also provides a headquarters to accommodate attaching other units from the Navy Expeditionary Combat Command, such as Navy mine countermeasures forces or naval mining forces. (See Figure 2.)

The manpower and capabilities to build this regiment would come by combining the engineers of the current combat engineer battalion, the current engineer support battalion, the engineers assigned to artillery regiments, the Marine wing support groups, and the Marine wing support squadrons. Additional engineer structure could be gleaned from the Supporting Establishment where many Marine engineers currently serve in facilities management and other billets that do not require their expertise. The regiment would be commanded by an experienced 1302 colonel, preferably a former commander of a CEB, MWSS, or ESB.

The combat engineer battalion (see Figure 3 on next page) will be solely focused on basic combat engineer functions. It would consist of a headquarters company, combat engineer companies (each with three combat

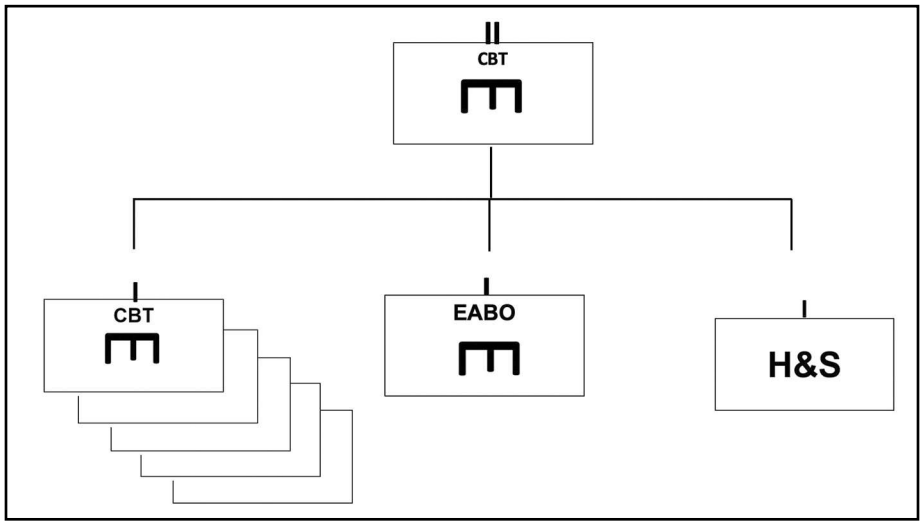

Figure 3. The combat engineer battalion.

engineer platoons), and an EABO engineer company. The combat engineer companies and platoons will be the base units to which other capabilities will be attached to form engineer task forces of various sizes, capabilities, and capacities. The number of engineer companies required is unclear. Currently, I and II MEF each have the equivalent of about eight companies' worth of combat engineers (MOS 1371) spread across the CEB, ESB, and MWSS. This is likely more than will be required to support the future force. The number of combat engineer companies actually required will depend on a thorough analysis of the new force design, the concept of employment of this force, and on the concept of employment for engineers. The most likely benefit is that consolidating in this way will result in significant efficiencies in manpower, but the correct amount of support needed remains to be seen. Whatever the total number of combat engineer companies ultimately works out to be, it has become clear that the current calculus used to determine the requirement in the Marine division (roughly one engineer platoon per infantry battalion) is obsolete and will no longer hold water.

The new CEB also contains a new unit: the EABO engineer company. This company will be formed of small teams of highly trained engineers, in the ranks of sergeant to master sergeant, built on the U.S. Special Operations Command model. These Marines will be thoroughly trained in several engineer disciplines, including the skills of bulk fuelers, electricians, heavy equipment operators, and hygiene operators, along with all of the skills usually resident in a combat engineer—allowing a small detachment of only two to four Marines to handle the full requirements of an established advanced base location. This would avoid tying the regular engineer force down to a certain unit and would enable a smaller footprint, once set up at a particular location.

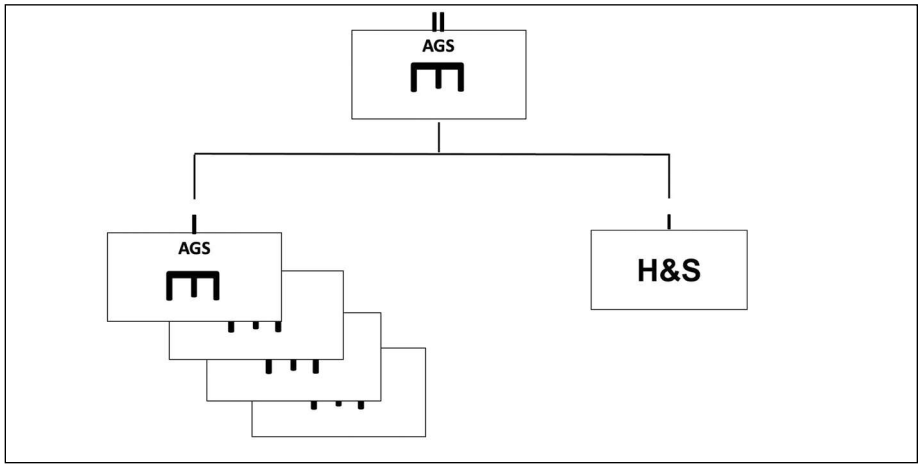

Figure 4. The aviation ground support battalion.

The AGS battalion would consist of three or four aviation ground support companies (built from the airfield operations company in the MWSS) and a headquarters company (see Figure 4). The AGS company will be the base unit to form task forces for such missions as establishing a forward arming and refueling point, refueling aircraft, handling and testing aircraft fuels, and conducting other airfield services–such as aircraft recovery and firefighting. These companies would be reinforced with combat engineers, motor transport, utilities, EOD, and heavy equipment as required.

The ESB (see Figure 5 on next page) is not intended to operate independently of the other battalions. Instead, it will provide the specialized functions needed to support engineer operations, including heavy engineer equipment, motor transport, bulk water, bulk fuel, electrical power generation, and EOD. It will be formed from the current EOD company and bulk fuel company at the ESB and from a pooling of both the present ESB engineer support company and the CEB engineer support company, along with the motor transportation, heavy equipment, utilities, and EOD sections currently in the MWSS.

Reorganizing combat engineers in this manner can provide many advantages to the Marine Corps. First and foremost, it will provide great savings in manpower and equipment over the current organizational model. It will simplify the planning and assessing of engineer operations by providing a "one-stop shop" for engineer support to the MAGTF. This in turn will make Marine engineers more agile and efficient by increasing the speed at which new engineer units can be task organized and assigned a mission, allowing the commander to very quickly form

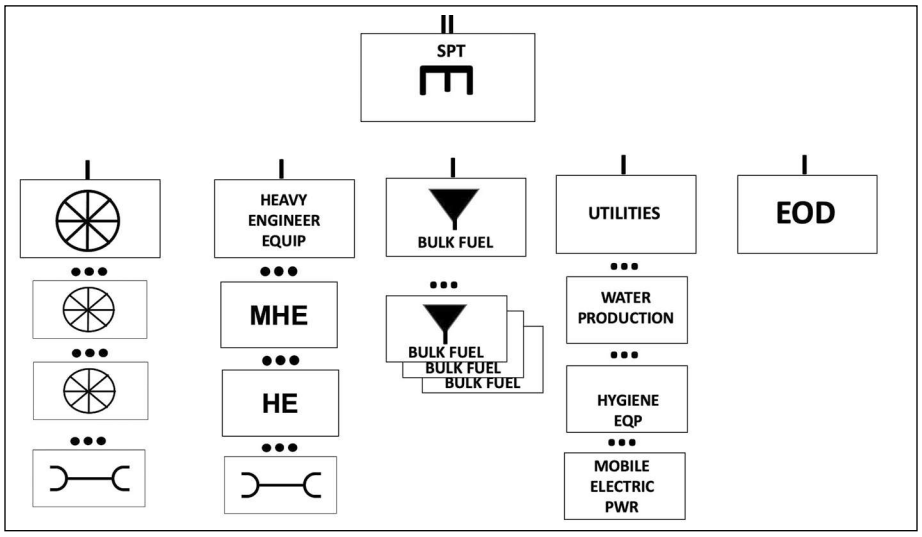

Figure 5. The engineer support battalion.

a wide range of possible capabilities, from the very light to the very heavy, with only the equipment actually required in each case. It will improve the training focus of each of the battalions, allowing each to train more efficiently. Consolidation will also ease the logistical burden of equipment maintenance during peacetime by allowing more centralized supervision and control of the maintenance effort and greatly reducing the total amount of equipment overall. During joint operations, the regiment will provide a qualified Marine Corps headquarters to command and control any attached joint force engineers, such as Navy Seabees. In 2019 the 38th Commandant, Gen David H. Berger, published the *Commandant's Planning Guidance* (Washington, DC: July 2019), which calls for drastic changes of Marine Corps organization, especially as it pertains to integrating with the Navy:

> As the preeminent littoral warfare and expeditionary warfare service, we must engage in a more robust discussion regarding naval expeditionary forces and capabilities not currently resident within the Marine Corps such as coastal/riverine forces, naval construction forces, and mine countermeasure forces. We must ask ourselves whether it is prudent to absorb some of those functions, forces, and capabilities to create a single naval expeditionary force whereby the Commandant could better ensure their readiness and resourcing.

The engineer regiment can provide an appropriate headquarters to lead integration with at least two of these examples: naval construction forces and mine countermeasure forces.

Perhaps most notably, this unity of command of all Marine engineers will result in countless intangible benefits, including a shared mindset of roles and responsibilities, a greater degree of supervision of engineer missions, and improved engineer leader development. The massing of combat engineer leadership in a regiment is likely to result in new and more creative tactical and operational ideas, concepts, and actions that now never get germinated because advocacy, collaboration, and mentorship are so dispersed. These intangibles and the future combat engineers they produce will have an immeasurable effect across all warfighting functions, engineer training, engineer equipment development, and doctrine.

Almost all of the manpower structure required to create these regimental headquarters can be gleaned from the units it will replace. Two of the three colonels needed could be repurposed from the staffs of the Marine wing support groups, which would no longer be required in this model. It is my belief that much additional structure is also available, scattered throughout the Marine Corps, especially within the Supporting Establishment. Marine combat engineers are still at many locations doing things like range maintenance, facilities maintenance, or the like: jobs that could easily be handled by civilian labor, freeing up active duty structure. However, the biggest hurdle for this course of action is the challenge it presents to our current mental model of the roles of each arm of the MAGTF—but this hurdle is only in our minds. We cannot allow our thinking to be enslaved by a dogmatic interpretation of the MAGTF to the point that we fail to consider common sense ideas. We must also resist the idea that we can somehow predict the future and attempt to predesign a specific, tailored force for a battle that we never fight. We must develop agile and flexible force structuring ideas and recognize the dangers of trying to presuppose the conditions in which these forces might be used. We must not "wish away" the challenges presented by the terrain, the climate, the populace, and both the conventional and irregular enemy threats. There cannot be a one-size fits all approach. The Marine engineer regiment would offer this flexibility.

The future is bright for the United States Marine Corps, but only if we can adapt to it quickly. The coming shifts of global power will present us with many new challenges and opportunities, often without much warning. Our organization must be increasingly agile and adaptable to many situations. Combat engineers will be a key enabler for all of this, and they need to be carefully managed and led. The changes presented here offer a new way to more effectively organize engineer resources through consolidation and centralized command. This will enable efficiencies in naval integration, task organizing, manning, training, and equipping combat engineer formations, which will in turn better support a more lethal, agile, and resilient Marine Corps.

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