

Marine Corps Engineer School

March 2015

Volume 8, Issue 1

Operational Engineer



Contents:

- CO, MCES Comments, page 1
- Rafting as a Ship-to-Shore Connector, page 2
- Engineers Prove Versatility in OEF, page 3
- High Mobility Engineer Excavator, page 4
- Engineer Assignments Policy, page 5
- CEB Company Participation in ITX, page 6
- Engineer Equipment Usage Study, page 6
- Combat Engineer Company, page 7
- Doctrine: What's in it for Me?, page 8
- Assault Gap Crossing, page 8
- Marine Corps Engineer Association Update, page 9
- Figures, page 10
- Errata, page 12

Engineers,

This, and future editions, of the Operational Engineer newsletter will solicit input from all Engineer Battalions across the Marine Corps, expanding the aperture for submission of topics. The concept for this shift from recent formats is to continue improving the newsletter for all Marine Engineers. Thus far, the response has been overwhelmingly positive, with a variety of topics provided from all three MEFs as well as higher headquarters agencies.

We ask Engineers who wish to contribute, or who may have comments/opinions based on newsletter content, contact us at MCES to provide input. The Operational Engineer newsletter is a forum in which we can share our thoughts, recommendations and opinions on issues important to our community. The newsletter is also a forum where, as a community, we can ensure all Engineers understand what is taking place across the Marine Corps with regard to Engineers. Having addressed the concept and philosophy behind the newsletter let me provide a quick update regarding MCES training facility improvements.

MCES is currently relocating our demolition range operations from the longstanding position at Engineer Training Area -1 (ETA-1) to a new location called the MCES Engineer Training Complex (ETC). The ETC is located approximately two miles from the entrance to Courthouse Bay, along Marines Road – also known of as Five-Mile Road (see Figure 1, [page 10](#)). The ETC includes new classrooms, instructor offices, supply/storage rooms, covered outdoor classroom, mine detector training area, and various ranges supporting practical application (see Figure 2, [page 10](#)). Classroom construction completed in early 2014 and instruction in the new facility commenced in May 2014. Mine Detector Training Lanes are in use and undergo daily improvement. A new Urban Breaching Facility is under construction by MWSS-271 Engineers and should be completed and operational by summer 2015. APOBS and Line Charge Training recently commenced after finalizing detailed planning and coordination with Camp Lejeune Range Control...as most Engineers know, the Surface Danger Zone for these assets is significant. The primary challenge with the ETC is transporting students from Courthouse Bay, which we resolved by obtaining bus licenses for all demolition range instructors.

Associated with relocating demolition operations, a new Route and Area Clearance (RAC) Mobility Course was designed and constructed at ETA-1. This course allows travel on various surfaces, e.g., asphalt, unimproved, and includes realistic obstacles such as culverts, manholes, curbs, etc. Robot training continues at ETA-1 taking advantage of natural terrain to provide realistic and effective training. Improvements continue aboard Courthouse Bay and I will keep all informed as efforts evolve.

As always, MCES works to support our Engineer community. Our first priority is to train entry-level Marines and prepare them for initial assignment to the Operating Forces. Simultaneously we focus on supporting Operating Forces with dedicated Doctrine, Capabilities, and Training and Education support, as well as Counter-IED Defeat the Device training. If you ever have questions or need support, please call and we'll do everything to help.

Semper Fidelis, Engineers Lead the Way.

Colonel S. A. Baldwin
Commanding Officer, Marine Corps Engineer School

Riverine Rafting as Ship-to-Shore Connectors

LtCol Gary Riedenbach – CO, 9th ESB

Throughout the month of October, III Marine Expeditionary Force participated in the annual bilateral training exercise Philippines Bi-Lateral Exercise (PHIBLEX) 15. Units to include 3d Marine Expeditionary Brigade, 31st Marine Expeditionary Unit, a Special Purpose Marine Air Ground Task Force, and Task Force 76 worked alongside their Filipino military counterparts and completed several training evolutions to include a command-post exercise, field-training, live-fire practice and humanitarian civic assistance projects. Logistical support for the exercise was to be provided in-part by a Maritime Pre-positioning Force (MPF) off-load of the USNS Sacagawea (SAC) by an embarked Combat Logistics Detachment (CLD-379). As a proof-of-concept mission for CLD-379, combat engineers from 9th Engineer Support Battalion were to assess the viability of the Bridge Erection Boat (BEB) and Improved Ribbon Bridge (IRB) system as a ship-to-shore connector¹, a concept not doctrinally practiced by Marine Corps bridging units.



Configured with one interior bay, two ramp bays, and two BEBs the raft can support 70,000 pounds or a Military Load Classification 45 at a sustained speed of less than 10 knots. Intended as a riverine-only system, the raft has an extremely shallow draft (22 inches) and has the added capability of being temporarily beached by dropping either ramp bay and allowing rolling stock to immediately drive off, minimizing exposure time on the shore. Non-rolling stock, such as palletized goods, can be off-loaded conventionally with a forklift or crane. The proof-



of-concept mission was centered around three parts: the embarkation of BEBs and collapsed IRB bays on the SAC utilizing organic shipboard cranes; the deployment, opening and assembly of IRB bays into open water in sea states up to 2; and upon mission completion, the raft could be disassembled and the bays collapsed utilizing the same shipboard crane.

Proof-of-concept concerns in utilizing the IRB/BEB system in open-water center around the difficulty of assembly and disassembly of the bay sections in heightened sea states and sea-worthiness of the BEBs due to their narrow beam and limited freeboard. Operating in sea states up to 2 on the Beaufort scale², the IRB/BEB system was able to conduct

movement from ship to shore with a limited payload.

Limitations that were encountered were based on reconfiguration time between conventional rafting (BEBs



perpendicular to the IRB, utilized to push up alongside ship or pier for loading/off-loading) and longitudinal rafting (BEBs

parallel to IRB, utilized for transit) and loading/off-loading times with shipboard cranes. In a one interior bay configuration, load limitations were encountered due to square footage of load area, not due to specific gross weight limitations.

The current IRB/BEB system is far from ideal as a connector and, even with improvements, will not match any current Navy connector (compare to the Improved Navy Lighterage System) in heightened sea states or absolute throughput. However, the current configurations of the MPF fleet preclude the embarkation of larger Navy connectors, opening up unique deployment opportunities for Marines. If option was to be explored, short and long-term improvements can be completed on the BEBs to increase their sea worthiness and ability to maneuver in up to sea states 2. In the short term, adding an electronic bilge pump on a separate circuit would create redundancy and twice the pump capacity, and increasing the amount of hull bumpers around the BEB would increase equipment longevity. Long-term improvements of the system in the ship-to-shore operational capacity would center on replacing the current BEB with an upgraded version based around the current model of the Rigid-Hulled Inflatable Boat (RHIB) such as the Navy's Harbor Security Boat (HSB). For continuous operations in sea states of 3 and higher, the IRB's cleats and bollards need to be assessed for strength and durability.



While this specific mission did not encounter any rapidly changing weather patterns, it cannot be discounted; the potential disaster from significant weather changes over the Pacific Ocean should be noted as a very real risk. The offload, configuration, and loading of the rafts can take from two to three hours. Severe weather changes throughout the Pacific can occur in far less time and place the raft and crew in danger if caught in open water. Not only is this a question of whether the equipment is suitable for the mission but also a question if the ship-to-shore logistical connector is a mission that the Marine Corps and the engineer community want to assume.

¹ – 9th ESB assigned this mission to Engr Company B, 2nd Platoon commanded by 1stLT Dylan Casey. His after action report and personal input were contributing factors in the development of this article.

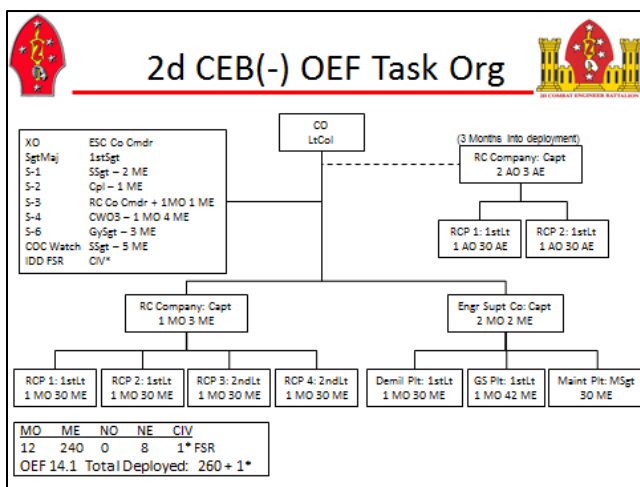
² - The Beaufort scale /[boufart](#)/ is an [empirical](#) measure that relates [wind speed](#) to observed conditions at sea or on land. Its full name is the Beaufort wind force scale, although it is a measure of [wind speed](#) and not of [force](#) in the scientific sense.

Engineers Prove Versatility Once Again in Recent OEF Deployment

2d Combat Engineer Battalion (CEB)

As Operation ENDURING FREEDOM (OEF) in Afghanistan came to a close, the 2d Combat Engineer Battalion (CEB) was called upon to “turn out the lights” for the Marine Corps. Always equal to the task, 2d CEB took on the mission and had tremendous success. They provided outstanding engineer support while renewing a culture of stewardship, emphasizing force preservation, and enabling professional growth. While in support of OEF 14.1 and 14.2, 2d CEB played a significant role in providing dismounted sweeping, mounted route clearance, force protection and survivability construction, tactical electrical power distribution, mechanical and explosive breaching, counter-improvised explosive device (C-IED) training, and general engineering efforts in support of the Camp Leatherneck Base Realignment, Closure, and Transfer (BRAC-T). The versatility shown by Marines at all levels while dealing with manning constraints, evolving mission sets, and equipment reductions was a demonstration of the flexibility and adaptability of the engineer community.

Due to constraints of troop reductions in country, the Battalion had the difficult task of cutting the structure down to less than half of the personnel in the previous CEB OEF rotation. The original task organization consisted of a company (reinforced) model led by a Major, a Captain as the Executive/Operations Officer, eight platoons, and a headquarters staff. As the mission evolved and the number of bases diminished in Regional Command (Southwest) [RC(SW)], the decision was made to cut one Demilitarization platoon based off original planning estimates that the Route Clearance Platoons (RCP) would be the most engaged elements, but change the overall construct to a battalion (minus) led by a Lieutenant Colonel. This altered the task organization to the construct shown in the diagram below. The Company Commanders were each dual tasked, one as the Executive Officer and the other as Operations Officer.



This construct, although necessary due to manpower constraints, levied a heavy requirement on the Company Commanders and required enlisted personnel to fill many officer billets, some as junior as a Corporal. Despite this understaffed task organization, the Marines of 2d CEB

provided high quality engineer support to the Marine Air Ground Task Force (MAGTF), 31st Georgian Light Infantry Battalion, 23rd Georgian Light Infantry Battalion, Combat Sustainment Support Battalion (CSSB)-36, and Special Operation Task Force (SOTF) West operations. While it would have made an already leadership heavy organization more so, the addition of an individual to fill the responsibilities of Operations Officer and Executive Officer would have paid significant dividends for the battalion. This would have allowed for greater focus in terms of planning, but also in the time allotted for mentorship internal to the companies.

The initial assumption route clearance would be the battalion focus of effort was inaccurate. As the Regional Command worked plans to retrograde Marines from Afghanistan, closure of Camp Leatherneck became a high priority. The Demilitarization Platoon significantly contributed to that effort. The platoon completed over 20 demilitarization projects as the lead effort for the battalion. The “Green Zone Wall” project was one of the high priority missions from the Regional Command. This project was a force protection mission that required in excess of 2,000 T-Walls to create a wall more than 7 kilometers throughout Camp Leatherneck and Camp Bastion to provide an alternate position for the Afghan National Security Forces upon the Marines’ departure. This project required the combined efforts of the platoon, the Combat Logistics Battalion, British engineer forces, and DynCorps International to complete. As the drawdown of forces and retrograde of equipment from outlying positions continued, the requirement for route clearance started at a high operational tempo. Within the first month, the Route Clearance Company (RCC) was involved in the retrograde of Tactical Infrastructure Sabit Qadam and Advisor Platform Nalay from Sangin with all four platoons. The support to the retrograde of forces and positions was not limited to US personnel as RCPs provided support for all of RC(SW). While the focus of effort for the RCC was route clearance, the flexibility of the platoons to support, or independently run, various demilitarization and force protection projects was critical to meet and exceed timelines.

The RCC as a whole supported more than 100 route clearance operations, 15 force protection projects, and 12 demilitarization projects in support of RC(SW). The overload of missions due to manpower constraints and the lack of a second demilitarization platoon were eased by the ability of the engineers to harness the full spectrum of their training to adjust to various mission sets.

The remainder of the Engineer Support Company (ESC) was able to focus on fulfilling traditional roles as they were task organized to do. The General Support Platoon provided a large amount of support to over a dozen named operations and numerous other unnamed operations. The majority of support was provided to 1st Battalion, 7th Marines (1/7) and 1st Battalion, 2nd Marines (1/2). The platoon filled the traditional roles of dismounted sweeping patrols, searches for caches, and assisted in cache reduction. The platoon completed more than 100 close combat engineer missions and supported more than 40 force protection missions. The Maintenance Platoon, with its heavy utilities component, was a highly sought for support throughout RC(SW). They were also a key component in the planning efforts for follow on electrical support for Camp Leatherneck. The Company as a whole supported more than 100 close combat engineer support, 40 force protection, 40-

Continued on page 4.

Engineers Prove Versatility (cont.)

enabler support, and 20 demilitarization projects in support of RC(SW). No matter what the task or how the mission changed, the Battalion always completed the mission on time and with a quality result.

A top priority for the Regional Command was the retrograde of personnel and equipment out of RC(SW). Meeting this directive was one of the greatest challenges the Battalion faced in balancing operational requirements with the timelines associated with equipment flying out. This was equally important for route clearance gear sets as well as heavy equipment for demilitarization because of the size and weight associated. The battalion overcame this difficulty through detailed planning, getting rid of redundant gear, and putting extra emphasis on taking good care of the equipment. Not having redundant capability was a necessary risk, but the Maintenance Platoon put in extra hours to ensure any equipment that was broken was fixed as expediently as possible. Throughout the deployment and during turnover, 2d CEB improved equipment accountability, supply discipline, and maintenance management, ultimately turning over with zero equipment loss or discrepancies.

A key take-away from the deployment is the requirement for commanders to command. Regardless of manpower constraints, an evolving mission set, or redeployment of equipment, the Marines of 2d CEB overcame adversity and executed every mission with the professionalism Marine engineers have shown for centuries. When it comes down to brass tacks, we flex and adjust to accomplish the mission and answer the call of "Engineers up!"

We dedicate this article to the Marines of 2d CEB who gave the full measure of devotion to their country during the deployment:

Staff Sergeant David Stewart, Corporal Brandon Garabrant and Corporal Adam Wolff.

This article compiles contributions of many fine officers assigned to the 2d CEB OEF 14.1 and 14.2 deployment. Contributors include Major Kirk Whittenberg, Captain Matthew Massman, First Lieutenant Bradley Dunlap, and First Lieutenant Matthew Thomas. Job well-done gentlemen, and welcome home! For more information, access the 2d CEB OEF after action report at the following link: <https://www2.mccll.usmc.mil/index.cfm?disp=servefile.cfm&filetype=CDR&ID=30768&repositoryDirectory>



High Mobility Engineer Excavator LtCol Michael Hixson - Fires & Maneuver Integration Division (FMID), Capabilities Development Directorate (CDD), Deputy Commandant Capability Development and Integration (DC CD&I)

Following endorsements from the Ground Combat Element (GCE) and Marine Expeditionary Unit (MEU) Operational Advisory Groups (OAG), Combat Development and Integration (CD&I) Capabilities Development Directorate validated the requirement for a scalable route reconnaissance and clearance capability (R2C) in May 2014 – i.e., get the highly successful

Marine Expeditionary Brigade (MEB)-level mounted R2C capability onto the MEU. To lighten the Marine Air Ground Task Force (MAGTF), however, we need this capability to be multi-purpose, highly mobile AND armored. This equipment capability exists:



During the GCE OAG in October 2014, the High Mobility Engineer Excavator (HMEE) was identified as a suitable replacement for the aging Back Hoe Loader (BHL) within combat engineer units – the HMEE is self-deployable and capable of travelling with the maneuver element at a top speed of 55mph with armor. The HMEE is a versatile "first response" engineer asset that can support early entry operations, capable of providing obstacle reduction, excavating, loading, lifting, and entrenching capabilities. The HMEE exhibits the potential to provide a MEU with limited route clearance capability. In sum, this protected, highly mobile, multi-purpose equipment could provide mobility, countermobility, and survivability support to the MEU.

The HMEE has been in service in the U.S. Army since 2007 with positive results. The Army views the HMEE as a force multiplier that enables commanders to gain efficiencies by reducing personnel and logistical footprints, while increasing operator protection. The picture below shows the damage sustained by an HMEE from an anti-tank mine in Balad-Ruz, Iraq in 2007.



The engineer, who was excavating a culvert at the time of the strike, walked away with minor injuries.

The Army now classifies the HMEE as a "critical dual use" asset, since it can be incorporated into their Route Clearance Interrogation System (RCIS). This developmental system will provide increased force protection by enabling the HMEE operator to semi-autonomously excavate, interrogate and classify deeply buried IEDs, explosive hazards and caches.

Six other countries currently employed the HMEE: Australia, Great Britain, Germany, Israel, and New Zealand.

USMC Engineer Personnel Assignments Policy

7th Engineer Support Battalion (ESB)

The current USMC policy of assigning Marines, and of particular interest for this audience, our engineers, directly to Monitored Command Codes (MCCs) within the Marine Logistics Groups (MLGs) predisposes the Groups and their subordinate commands to personnel assignment complications and the potential for substandard MOS-specific unit training management, while also restricting individuals to finite Operational Force experiences and limited Occ Field mentoring and development.

This concern is systemic, contributes to the Commandant's concern in his recent planning guidance that "units are experiencing significant gaps in the numbers of unit leaders with the right grade, experience, technical and leadership qualification associated with their billets", and unfortunately has the potential for disastrous consequences without appropriate oversight and intervention. Our engineer community as a whole has been concerned with the validity of engineer formations within the CLBs for several years; however, the facts of the current situation are that this structure exists and is here to stay, at least for a while. At this point we must gather data to justify and prove why this organizational construct is flawed for potential opportunities to "right the ship", while doing our best to ensure the young Marines in our community are given ample opportunity to succeed and develop their knowledge and experience base, thus ensuring the success and legitimacy of our community for years and decades to come. In doing so, we must work to educate and influence our fellow Marines within the MLGs and M&RA that simply placing Marines directly into these MCCs via monitors, without the oversight of the local engineer establishment, reduces the quality of engineer that our community will produce and that our service will ultimately realize, while it also restricts the ability of commanders to adequately assign individuals to key positions.

The most concerning direct assignment is the 1302 to the MEU CLB Engineer Detachment, a billet that historically was specifically screened for and filled by Marines that had gained experience within the ESB and had proven their potential, as well as a billet that directly correlates with the CMCs focus on developing amphibious experience breadth across our Corps. Now, we often see new Second Lieutenants assigned straight from MCES to this detachment with an anticipated three years on station. This detachment, which is authorized 29 enlisted Marines and one officer across five engineer specific MOSs, requires the Lieutenant to not only manage the platoon's employment, but to also provide sound engineer advice and counsel in support of battalion operations and training that impact the entire MEU. More often than not, this Lieutenant is serving as the senior engineer in the battalion with little to no oversight from a more experienced engineer. Of course, some CLBs do have a 1302 Major or Captain in the T/O XO billet, or elsewhere in the operations section, but this is not always the case, and even when they are there, their focus is broader and not easily focused on the direct oversight of the new Lieutenant. With this position being a direct assignment from the monitor, a Lieutenant can be placed as a platoon commander for two or three years offering him little experience outside of the MEU CLB construct and associated engineering

missions. To add to this risk is the assignment of the senior enlisted advisor, a 1371 GySgt, to this platoon by the monitors. Personalities do not always align, and with these shot in the dark assignments, the right SNCO and officer may not be assigned to the right place at the right time. And to go a step further, we must understand that the same difficulties may surface lower in the rank structure, particularly in terms of individual Marine proficiency and maturity to operate in a deployed operational environment with limited backup within their MOS.

In order to provide some alleviation/avoidance of the above mentioned problems, 7th ESB works aggressively with adjacent Regimental and Battalion Commands to ensure that the 1302s assigned to their commands are the right fit and skill level necessary for their associated missions. We also maintain close relationships with the leadership of the engineer formations and regularly conduct combined training with them in order to assist in broadening their perspective of the engineer community's capabilities and training management perspectives. At this point, we currently have seven officers TAD from five other 1st MLG commands in order to assist in their individual development with the intent of giving those commands back stronger and more capable officers within a structured community environment. This informal management is necessary to ensure the success of the engineer community within the MLG, but would prosper even further by codifying the relationships and expectations of all the stakeholders. This is an ongoing recommendation/discussion emanating from 7th ESB between commanders that will remain as a persistent and necessary effort in order to benefit the members of our community across the MLG. With increased willingness of the MLG staff to enable internal TAD, Group Support Orders and/or PCA moves, and advocating for the ESB Commander to be recognized as the senior engineer in the MLG with control over significant in-house subject matter expertise to make recommendations regarding individual MOS management, more leverage would be given to affect 11XX/13XX moves and assignments to develop our community, ensure successful engineer support to the MEF, and identify/train the engineers that demonstrate the greatest potential for future assignment and leadership in the engineer community. At the service level, it is recognized that changing USMC policies is slow and embroiled in bureaucracy; however, every effort to voice this concern through our advocacy processes needs to be made in order effect change with the policy of directly assigning Marines to MLG subordinate command MCCs.



Advocating for Active Duty CEB Company (REIN) Participation in Integrated Training Exercise

LtCol Frank L. McClintick – Inspector/Instructor, 4th CEB

As Inspector-Instructors, we have the unique opportunity as Active Duty Marines to see the Reserve perspective to training and operations. Due to this perspective, we will advocate for Active Duty CEB companies to participate in ITX as a company (REIN) in support of a Regiment (or standalone unit if the Regiment chooses not to participate) vice sending two platoons, alone, with their respective supported Infantry Battalion. We will also discuss the differences between a Reserve ITX and an Active Duty ITX; and the advantages of participating as a company (REIN).

Currently, Active Duty CEB companies send a platoon with each supported battalion to participate in ITX, while the Company HQ and the third platoon remain back in Camp Pendleton or Camp Lejeune. As there are likely reasons “why not”, such as the Regimental HQ is not playing, we will concentrate efforts on “why” a CEB company (REIN) should participate.

An Active Duty led ITX is a 30-day training evolution, which encompasses the full spectrum of events offered by TTECG; whereas, a Reserve led ITX is constrained to 14-17 days due to the allocated funding authorized to pay SMCR Marines for their annual training (AT). Reserve CEB Marines generally are required to get an extended AT (17 days) due to the amount of planning, preparation, and rehearsal required prior to the platoons chopping to their respective supported battalions. These events include – MOT, MOC, MAC, MFME, OCD, AAC, and Ranges: 410A, 401, and 400. The uniqueness of the Reserve ITX is that the 4th Marine Division has incorporated a Regimental HQ as part of the exercise which has allowed for a SMCR CEB Company (REIN) to deploy in support of the exercise. A normal SMCR CEB Company (REIN) consists of approximately 135 personnel, which are made up of three line platoons, one support platoon, and a company headquarters. This construct will provided two direct support platoons to the battalions and the remainder of the company in general support.

The advantages gained by participating in the full 30-day evolution following the SMCR table of organization are:

- Integrated engineer efforts – combined arms breaching is the “varsity” event for engineers in ITX, however, engineers rarely get to fully integrate in preparation for this event. With a company (REIN) participating, the ABV teams from MAC Company would be attached (vice augmenting the event), all while attacking under the oversight of the Breach Force Commander. The Company Commander and XO can push logistics, support movement and provide oversight and necessary rank/experience to ensure Engineers get the proper guidance and supervision.

- Engineer oversight – Platoon Commanders in our community are presented with an incredible amount of responsibility, with little to no experience. Our T&R manual is massive and generally, everyone believes (by virtue of our MOS) we are fully versed in every aspect of engineering. With the support of

a Company Commander, the Platoon Commanders will get an enhanced learning experience while providing supported Battalion Commander requested engineer support, guidance and advice, thus setting the Lieutenant up for success in future operations and providing his supported Infantry Battalion Commander confidence in his supported element.

- Enhanced officer experience – As young officers (both as a Lieutenants or Captains), we have all faced times that we might have not had the highest level of experience or confidence in the task that we were given. As Battalion Commanders it is our responsibility to develop these young officers. In the Reserves, we only have 24 days (48 drills) and a 14-day AT to ensure that our officers are properly trained and ready to deploy. The deployment of a Reserve Company (REIN) to ITX has been essential in the development of the Battalion’s Platoon Commanders and their respective Company Commanders. Sometimes, we have a young Captain coming from a different MSC or even a seasoned Captain coming from a different MSC with a follow on assignment (out of MOS) and they find themselves “out of their league” when advising a Regimental Commander and directing engineer operations within the Division. Providing the proper oversight will increase these individuals ability to provide sound guidance to the Regiment in a contingency environment (not to mention foster the support of his subordinate commanders).

- Logistics experience – Any Company XO can use more logistics push and logistics pull experience. Bringing a Company (REIN) to ITX will allow the XO to gain the experience in logistics planning and support in a training environment. ITX does provide a forgiving environment for the XO to “bump his head” while learning to work with the Platoon Commanders, Battalion staffs, and Regimental Headquarters. Once in a contingency environment, this unthankful task will be of greater scope and importance.

As Active Duty Regiments try to mirror the Reserve Regiments in sending a Regimental HQ to 29 Palms, I believe it is time for the Active Duty CEBs to mirror what 4th CEB has been able to accomplish in sending a company to support every ITX. The experience that our Marines will garner from this training will continue to set us up well into the future.



Engineer Equipment Usage Study

CW05 Al Mayfield – Engineer Advocacy Branch (LPE), LP, DC Installations and Logistics (I&L)

**Capt Chris Wood – LX Branch, DC I&L
Mr. Sammy Hammonds, MCES**

How much equipment can a single heavy equipment operator maintain or operate? How much equipment can one heavy equipment mechanic repair? Does a useful formula that provides a realistic ratio between equipment to personnel exist? These questions have been asked countless times. The past decade (plus) of war has afforded the Marine Corps the opportunity to procure an abundance of new and unique equipment to support the warfighter. Some argue fielding this equipment without proportionally increasing personnel has adversely affected the equipment to maintainer ratio for most operational units.

Continued on page 7.

Equipment Usage Study (cont.)

For 14 months, MCES and LPE conducted an Equipment to Maintainer Ratio (EMR) study to measure how the equipment and personnel ratios changed over a 16-year period. This study also reviewed garrison Engineer Equipment usage.

The EMR analyzed of Tables of Organization and Equipment (TO&Es) of four engineer equipment intensive units to measure variations in equipment to maintainer ratios occurring from 2001 to 2017. The study analyzed enlisted 11XXs and 13XXs MOSs and BRAVO TAMCNs within 2^d CEB, 7th ESB, HQ Battery, 10th Marines, and MWSS-274. In a nutshell, the study shows that, following 182k force reductions in FY 2017, engineer equipment to maintainer ratios in these units, with the exception of MWSS-274, will improve respective to FY 2001 ratios. In addition, the study highlights areas ripe for further improvement through slight adjustments to personnel or equipment.

The Equipment Usage Review portion of the EMR study provides empirical data, collected from 13 engineer units across all MEFs. The data shows actual equipment usage and repair cost averages over equipment life. This data will support commanders' decision-making on challenging issues such as long-term storage, future equipment/cost reductions, training allowance, etc. For example, III MEF applied the Equipment Usage Review in developing a Contingency Storage Program.

DC, I&L has initiated a comprehensive study of equipment to maintainer ratios across all types of equipment, in addition to the EMR. The first phase of this effort computed two ratios; one for current/actual on-hand equipment and personnel, and another for authorized equipment and personnel structure, i.e., TO&E. Ratios were computed at the unit-level, rather than computing ratios at higher command levels. This gives a detailed view of actual ratios, for all types of equipment, and for each unit in the Marine Corps. The second phase will now use this information to determine the factors having greatest effect on equipment to maintainer ratio. For example, an equipment factor could be "mission criticality", "operational requirement", or "maintenance requirement". These factors inform common planning guidelines any Marine at any level may apply in equipment and personnel planning.

These studies will assist the semi-annual Sustainment Readiness OAGs by using objective data to help establish equipment to maintainer ratio policies and guidelines. In turn, these policies and guidelines will support Marines across the enterprise by providing a shared baseline for planning equipment and maintainer requirements.



Combat Engineer Company

Combat Engineer Company, Combat Assault Battalion

Combat Engineer Company (CEC), Combat Assault Battalion (CAB) is in the business of blowing things up...and business is BOOMING! CEC provides direct support to 3d Marine Division with its Utilities and Heavy Equipment sections and simultaneously supports numerous theater security cooperation exercises throughout the Pacific Area of Responsibility.

The scope and scale of the CEC mission within these exercises range from conducting large-scale live fire combined arms breaching operations to providing subject matter experts to instruct and work hand-in-hand with foreign forces on engineering tactics, techniques, and procedures. In addition, CEC sustains a six-month rotation with a Combat Engineer platoon to the 31st Marine Expeditionary Unit, providing mobility, counter-mobility, and survivability to the Battalion Landing Team.



CEC at Camp Fuji

Most recently, CEC employed Marines in support of Exercise Harii Hamutuk 15, a multilateral construction exercise in Timor Leste between the U.S. Marines and the Timor Leste Defense Force. During the exercise, the Marines supported the creation of a Military Operations on Urbanized Terrain (MOUT) facility, the renovation of an office supply warehouse, and construction projects at the Hera Naval Accommodation Site and the Hera Community Center.



CEC learning to make and employ fascines, Okinawa 2014

Looking towards future operations, CEC recently constructed and employed fascines during CAB's combined arms breaching training exercise in November of 2014. While fascines have not been used recently, they remain an expedient, cost effective, and efficient means of gap crossing. Currently, CEC has Engineers employed in support of Integrated Training Exercise 2-15 in 29 Palms, California as is prepared to deploy Engineers in support of Balikatan 2015 in the Republic of the Philippines and Marine Rotation Force-Darwin (MRF-D) in Australia. Support to MRD-D is expected to grow as we develop training opportunities with the Australian Defense Force.

Doctrine: What's in it for Me?

Mr. Joe Baes, MCES Doctrine Branch

Marine Corps doctrinal publications will do nothing for you...unless you open the books and read them. Ask yourself this question, "Have I read the publications associated with my MOS or the publications associated with my current position?" Most Marines don't "have the time" to read the books pertaining to their job because they are too busy performing day to day operations. But, if you take the time to read "your" pubs and the higher order pubs, you will have a better understanding of how everything works together (and it may save you some time in the long run).

Marine Corps Doctrinal Publications. There are currently four categories of doctrinal pubs.

1. Marine Corps Doctrinal Pub (MCDP) = How we think. Per MCO 5600.20P, MCDPs are higher order doctrine containing fundamental and enduring principles regarding warfighting and the guiding doctrine for the conduct of major warfighting activities. X

X 2. Marine Corps Warfighting Pub (MCWP) = How we operate. More narrowly focused than MCDPs, MCWPs contain the doctrine and tactics, techniques and procedures (TTP) utilized by the Marine Corps in the prosecution of war or other assigned missions. Provides TTP for successful MAGTF Operations. Written to the officer and SNCO level.

3. Marine Corps Reference Pub (MCRP) = How we do it. MCRPs are pubs containing general reference and historical material, or more specific/detailed TTP than MCWPs. These are written to address the small unit or individual Marine level. They provide system, platform or individual TTP.

4. Marine Corps Interim Pub (MCIP) = Temp pub (2 yr life span). MCIPs rapidly disseminate new TTP, based on findings from lessons learned, training and experimentation. MCIPs expire after 2 years (or earlier, if superseded by a new or revised MCWP or MCRP). The 2-year period is intended to allow for in-depth validation and incorporation of information into MCRPs/MCWPs during their regularly scheduled review cycle. The DC CD&I makes MCIPs available to units via the publication distribution systems, to ensure commonality across the Marine Corps. They are written to provide needed information to Marines while doctrine is being developed.

Where can I find information on doctrine? Marine Corps Doctrine Web Site. www.doctrine.quantico.usmc.mil.

Marine Corps Engineer School Doctrine Web Site: <http://www.mces.marines.mil/StaffSections/S3Operations/DoctrineBranch.aspx>. Two links exist on the MCES doctrine home page: Engineer Doctrine Placemat and the Doctrine Branch Update Table. Using these links you can find the most up to date information regarding engineer doctrine. (CAC required)

Quiz:

1. What is the number for the doctrinal publication for your MOS?
2. What are the higher order publications for your MOS?
3. When is the last time you read or referenced an MCWP or MCRP?

I challenge you to take the time to read one publication related to your MOS and share that information with another Marine.

MCES Doctrine Update. In addition to the information available via the MCES Doctrine Branch website, the branch continues to work on two initiatives.

1. MCES and the Army Engineer School have submitted 13 reconnaissance forms/reports for digital conversion into DOD forms/reports. We'll update when conversion is completed and the forms are available for use.
2. MCES developed and received DOD approval to use unique military symbols for the following units; assault breaching platoon, assault bridging platoon, route reconnaissance and clearance platoon, mobility assault company, bulk fuel company, support company (CEB) and AAV (MCM) section/platoon. The Defense Information Systems Agency will add these new symbols to DOD command and control systems (such as C2PC). We'll update when this is completed. MCWP 3-17 has been revised and now includes an appendix which contains unit and equipment symbols.

"You don't have to know all the answers, just where to find them".



Assault Gap Crossing

LtCol Hixson – FMID

Enabling the maneuver of an assault force is a mission essential task of Marine Corps combat engineers. Supporting the Marine Air Ground Task Force (MAGTF) and enabling the maneuver of its ground elements – in any climate and place – will invariably mean that engineers must mitigate both enemy and natural obstacles – threats to the MAGTF and its ground mobility. Physical gaps encountered by the MAGTF present a significant mobility challenge to the maneuver commander; natural gaps that abound in any environment in which the MAGTF operates compounds the countermobility effort of the enemy. To assault force engineers, wet and dry gaps, whether natural or manmade, are obstacles that require a survivable, rapidly deployable bridge to cross.



Currently, the Armored Vehicle Launched Bridge (AVLB) is the only assault bridging option available to a MAGTF maneuver commander. Its massive size, weight, and capability to support a combat vehicle weight up to 85 tons, however, render it very unlikely that the AVLB will ever support Marine Expeditionary Unit (MEU)-level operations or smaller, such as a Special MAGTF.

AVLB Characteristics

- Scissoring-Type / Class 70 / Aluminum
- Weight: 29,300 lbs. (113,200 lbs. with M60A1 launcher)
- 31' length x 12' width x 10.8' height (in stowed position)

Continued on page 9.

Assault Gap Crossing (cont.)

- 60 ft. crossing capability with prepared abutments
- 57 ft. crossing capability with unprepared abutments

In keeping with the tenets of Expeditionary Force 21 (EF21), the Marine Corps' current operating concept, this critical capability should be scalable to support our smaller MAGTFs, especially since these smaller MAGTFs have smaller and lighter vehicles and arguably operate more frequently in a wider array of environments. A smaller and lighter bridging system should be capable of crossing small gaps less than 25 meters, such as a tank ditch or irrigation canal, and can support most MAGTF's light and medium combat and tactical vehicles that are less than MLC 40. A new system should be transportable by light tactical vehicles and rapidly deployable.



Marine Corps Engineer Association (MCEA) Update

Mr. Ken Frantz, MCEA

Planning continues for our Jacksonville, NC annual reunion which will be fall of 2015. The awards banquet will be conducted during our gathering along with tours of the local attractions and a visit to the engineer units aboard Camp Lejeune.

The draft MARADMIN for the 2015 MCEA awards program will be provided to HQMC early January so it's not too early to start identifying your nominees.

The picture of our MCEA monument at the National Museum of OUR Marine Corps shows the recently installed bricks.



MCEA Engineer Monument

Dedicated 14 May 2014, as an enduring tribute to all Marine Corps Engineers, past, present and future in the Semper Fidelis Park at the National Museum of the Marine Corps. Personalized and unit bricks available for purchase to be located adjacent to our Engineer Monument. Make it a point to visit the monument if you are at the museum. Maps, brick order forms and all the details are on our website:

<http://www.marcorengasn.org/modules/Monument/brickprogram.htm>

What is it? MCEA is a HQMC sanctioned, tax-exempt, nonprofit organization, incorporated in NC, in 1991. MCEA provides a unique opportunity to connect or reconnect and maintain communication with Marine Corps engineers, the Marine Corps family, recognize outstanding performance of individual Marines and engineer and Seabee organizations, and to leave a memorable legacy of our Marine Corps engineer brotherhood.

MCEA Purpose/Bylaw highlights:

- Promote Marine Corps engineering in combat engineer, engineer equipment, utilities, landing support (shore party), bulk fuel, topographic and construction engineering, drafting, and Explosive Ordnance Disposal (EOD); Promote an accurate historical record of Marine Corps engineer contributions
- Renew and perpetuate fellowship of retired, former and current US Marines who served with Marine Corps Engineer units and sister service members who served in support of Marine-Air-Ground Task Forces (MAGTFs); foster solidarity of Marine Corps engineers
- Keep members current with the Marine Corps engineer community
- Annually recognize superior achievement of active duty and reserve establishment Marine Corps EOD and engineer individuals & organizations, as well as Naval Construction Force Units
- Provide Financial Assistance to Marines, their next of kin or other deserving personnel

MCEA Eligibility. All former and current Armed Forces personnel who served with Marine Corps Air Ground Task Force (MAGTF) Units or in support of Marine Corps Engineer Units or US Marine Corps Base and Station billets.

Membership Benefits:

- Very affordable membership dues! 100% of dues and contributions tax deductible
- Contributions to MCEA, Assistance Fund and Engineer Monument Fund qualify for Fellows Program
- Access to members' roster and capability to locate and reconnect with Marines and Sailors
- Annual reunion with opportunity to interact with veterans as well as active/reserve duty personnel, corporate members and "Best of the Best" award recipients and their families
- Availability of the MCEA Financial Assistance Fund
- Subscription to MCEA newsletter; unlimited access to website and special "members only" section
- Notification of employment opportunities especially in the DOD and civilian engineering community
- Access to history, lineage and other information about USMC engineer units
- Availability of unique MCEA Ship's Store items; discounts on Military Historical Tours, Inc.
- Exclusive assistance from Ingenieur Executive Company for job and contract placement
- Special partner-association pricing on Marine Corps Association membership
- Discount prices on Society of American Military Engineers courses

MCEA: www.marcorengasn.org

Figures

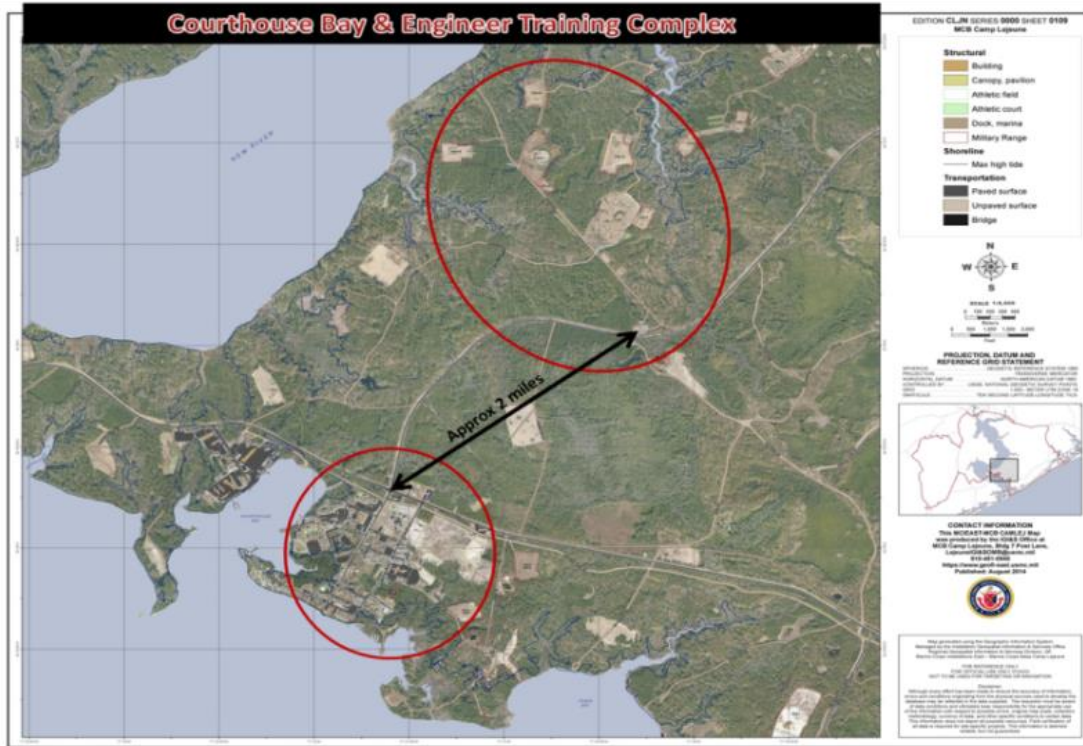


Figure 1: Distance from Courthouse Bay to ETC

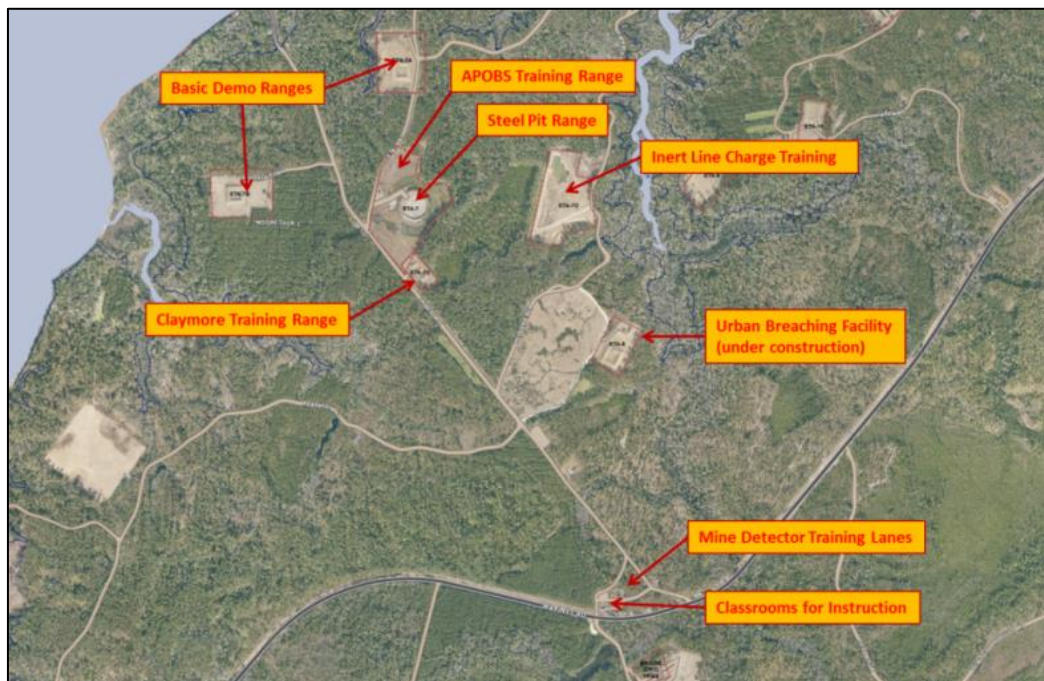


Figure 2: Engineer Training Complex and Ranges

[Return to page 1](#)

This Page Intentionally Blank



Purpose

The purpose of the *Operational Engineer* is to provide a useful forum for open discussion and free exchange of ideas relating to the U.S. Marine Corps Engineer community. Thoughts, suggestions and ideas from all are essential to achieving this purpose.

Submissions

Provide submissions via email (preferred) or regular mail, please include contact information. Feel free to submit:

- Commentary on published material
- Articles dealing with topics of interest to the Engineer community
- Ideas and Issues that could affect or do affect the Engineer community
- Letters to the "editor"

Next Issue

The next issue of the *Operational Engineer* will be published during the first week of June 2015. To ensure timely publication of your offered content, provide submissions by 15 May 2015.



Marine Corps Engineer School

PSC Box 20069
Camp Lejeune, NC
28542-0069

PHONE:
(910) 440-7144

FAX:
(910) 440-7360

Visit us on the Web!

at:

<http://>

www.trngcmd.marines.mil/

