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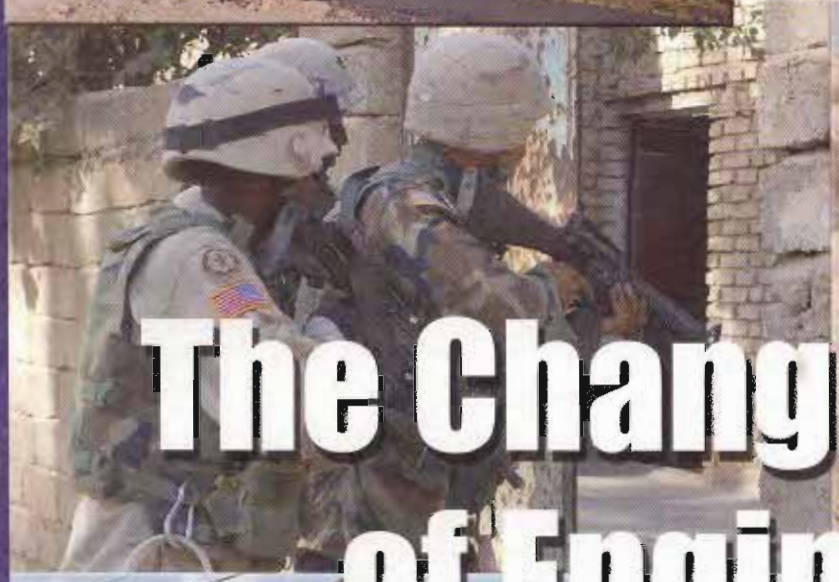
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The Changing Role of Engineers



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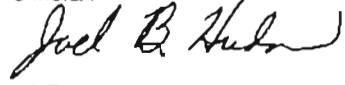
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Front Cover:
Varied photos show the roles of engineers.

Back Cover:
2d Engineer Battalion: A view of Camp No. 1, Dogan's Farm Division Headquarters. Photo courtesy of the U.S. Army Engineer School History Office.

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Clear The Way

By Major General R.L. Van Antwerp
Commandant, U.S. Army Engineer School



I can't tell you how much we enjoyed having you at ENFORCE this year. From my view, there was an excellent exchange of ideas and a hearty celebration of our Regiment and the accomplishments of our sappers and engineers. We were blessed because you came, and we're already looking forward to next year!

Approximately 500 senior leaders attended the conference—leaders from active duty, reserve, and National Guard; the Army Corps of Engineers; civilians from the Army Corps of Engineers; retired civilians and general officers; and engineer representatives from industry. Engineers from the Air Force, Navy, and Marine Corps all sent senior leaders, and delegates from Germany, France, Australia, Canada, and Great Britain attended as well. A big thank-you to all who did the heavy lifting and made it special.

We were honored to have a wide variety of speakers at the conference: General Kevin Byrnes, Commanding General of TRADOC; Lieutenant General Bob Flowers, our Chief; Major General Richard Wightman, Joint Warfighting Center, U.S. Joint Forces Command Deputy Commander; Major General David Melcher, Director of Program Analysis and Evaluation Directorate of the Deputy Chief of Staff, G8; Major General Ron Johnson, Commanding General, U.S. Deputy to the Program Management Office, Coalition Provisional Authority in Baghdad, Iraq; Colonels John Peabody and Gregg Martin and a great international panel of Colonel John W. Shanahan OBE, United Kingdom; Captain William C. McKerall, U.S. Navy; Colonel Bill Sowry, Australia; Lieutenant Colonel Anthony Funkhouser, U.S. Army; and Major Keith Cameron, Canada.

The Regiment focused on how our Future Engineer Force will be designed to support joint and multinational operations. We were able to pull together the senior leadership and take a close look at how the Engineer Regiment needs to change to meet the structure of the Army of the future. The conference breakout sessions were a great success in giving our developments folks the input they need from the field to plan the Future Engineer Force structure as a modular force. During the multinational operations breakout session, foreign-service delegates discussed common problems and concerns and proposed solutions. They also talked about engineer equipment and capabilities.

At ENFORCE we set the stage to move toward a jointly trained and equipped engineer force capable of organizing and deploying to any area of operations and employing separately or as a joint force in support of the combatant commander. We need to become more efficient. We can all benefit from financial savings if we purchase equipment together or use one contractor or supplier. We are exploring ideas to find a way for the branches of service to work together better, even to the point of proposing an engineer joint training center. Ideally, we want a force that is made up of four services that are trained alike, equipped alike, and capable of supporting the warfighter in whatever way he needs.

As this also becomes my farewell article, I challenge you to continue this transformation and rebuilding that we've begun. Much of what we're learning has been paid for by the sweat and blood of engineer soldiers. There have been times when the "book solution" didn't always work, but innovative and adaptive engineers found a way to get it done right anyway. Much of that was captured at ENFORCE and will be analyzed through the Center for Army Lessons Learned.

As we remembered our fallen comrades in the historic World War II chapel next to our memorial grove, I thought of the great legacy we have and the sacrifices that have been made in our ranks. We owe it to them to do our very best for them and for our Army. Our Regiment is strong because they—and you—make it so. The sapper spirit is alive and well. Essayons!

First Lieutenant Doyle Hufstedler	1st Engineer Battalion, Fort Riley, Kansas
Specialist Sean Mitchell	1st Engineer Battalion, Fort Riley, Kansas
Specialist Michael Karr	1st Engineer Battalion, Fort Riley, Kansas
Private First Class Cleston Raney	1st Engineer Battalion, Fort Riley, Kansas
Private Brandon Davis	1st Engineer Battalion, Fort Riley, Kansas
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Sergeant Brian Wood	9th Engineer Battalion, Schweinfurt, Germany
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Specialist James Holmes	141st Engineer Battalion, Hettinger, North Dakota
Specialist Dennis Morgan	153d Engineer Battalion, Winner, South Dakota
Sergeant Cory Brooks	153d Engineer Battalion, Winner, South Dakota
Private First Class Thomas Caughman	391st Engineer Battalion, Spartanburg, South Carolina
Specialist Doron Chan	411th Engineer Brigade, Windsor, New York
Private First Class James Parker	588th Engineer Battalion, Fort Hood, Texas
Private First Class Bert Heyer	652d Engineer Company, Ellsworth, Wisconsin

Lead The Way

By Command Sergeant Major Clinton J. Pearson
U.S. Army Engineer School



I would like to take this opportunity to thank the command team of the 1st Engineer Brigade for their efforts in making ENFORCE 2004 the success that it was. Under the leadership of Colonel Paul Kelly and Command Sergeant Major Gerald Jones, the soldiers and civilians of the brigade showed their dedication to the mission by working tirelessly throughout the weeks leading up to and during the conference And thanks to the Army Engineer Association (AEA) for its hours of support throughout the week. A special thanks goes to Mrs. Nancy Gregory and her team in our Executive Services Office for their work. Thanks for all you continue to do for our great Regiment and for making ENFORCE 2004 such a success

Among the many events that took place during ENFORCE was the annual Council of Command Sergeants Major. It was great to see so many representatives from across the Regiment. Briefings ranged from Command Sergeant Major Michael Cline (5th Engineer Battalion) and Command Sergeant Major Greg Glen (555th Engineer Group) speaking on lessons learned from Operations Enduring Freedom and Iraqi Freedom, to Master Sergeant Sean Conner (Sapper Leader Course Noncommissioned Officer in Charge) giving a course update, to Master Sergeant Michael Bergeron and Staff Sergeant Richard Cook briefing on mine/countermine and the Mine Dog Section

In concert with our ENFORCE theme, *Forging our Future - Shaping Engineers for Joint and Multinational Operations*, we were fortunate to have briefers from our sister services. Master Sergeant Frank Miller (U.S. Marine Corps), Master Chief Thomas Babb (U.S. Navy), and Chief Master Sergeant Steven Fraher (U S. Air Force) provided updates that will bridge the gap between engineer capabilities in all services as our armed forces move into a new era of joint operations.

One of the most debated briefings came from Lieutenant Colonel Bryan Watson. It drew a mixture of support and dissent when he spoke on the Future Engineer Force, based on the White Paper on that subject. It is my sincere hope that we left this briefing with a better understanding that the Regiment must change now to support the combatant commander. The White Paper, which articulates our vision for the Future Engineer Force, is consistent with the Army's transformation to a joint and expeditionary force.

Activities the rest of the week included the AEA Golf Scramble and the annual AEA luncheon. Honored guests at the luncheon were Major General Jack Waggener (Retired) and Command Sergeant Major Jack Butler (Retired), our outgoing Honorary Colonel and Command Sergeant Major of the Regiment. Receiving their charge as the incoming Honorary Colonel and Command Sergeant Major were Major General Pat Stevens (Retired) and Command Sergeant Major LeRoy Mello (Retired). Both were formally recognized at the 15th Engineer Regimental Dinner. We were fortunate to have Mr. Don Stivers, who unveiled his first-ever engineer print. Titled *The Command Team*, the print depicts the relationship between commander, command sergeant major, and their soldiers as they prepare to cross the line of departure.

This year's Regimental Review/Regimental Muster featured a special tribute to Lieutenant General Robert B. Flowers, 50th Chief of Engineers. Unbeknown to General Flowers, when the adjutant gave the command "Officers and Colors, Post," the colors from all of General Flowers' previous units posted to the side of the reviewing stand. Also, during the "Pass and Review," General Flowers was joined on the reviewing stand by his wife Linda and honors were rendered to the entire Flowers family for all of their years of service, support, and dedication to the Engineer Regiment and the Army. They will surely be missed when he retires this summer.

The most explosive event was the Sapper Leader Course demonstration after the Regimental Run. We also introduced a "Best Sapper" competition that will be held at Fort Leonard Wood on 22-25 April 2005. Select and train your best sapper team for this new annual competition.

Among those honored at the Regimental Dinner were the recipients of this year's Regimental Awards. See page 30 for a list of the active duty, reserve, and National Guard winners. Congratulations to all of these outstanding sappers.

We took the time to honor our fallen sappers during a solemn memorial ceremony at the Engineer Memorial Grove. Lieutenant Colonel Tony Funkhouser and Command Sergeant Major Michael Cline, command team of the 5th Engineer Battalion, recited the names of all our engineer comrades who have given their lives in support of Operation Enduring Freedom and Operation Iraqi Freedom. This somber event served as a reminder that freedom isn't free. We are forever in their debt, and our thoughts and prayers are with the families of every soldier who has paid the ultimate sacrifice. We continue to pray for those soldiers who are deployed in harm's way.

Engineer Expeditionary Force Design Concepts—From Theory to Practice in Task Force Able

By Colonel Christopher J. Toomey

The Army is changing. Recent dramatic changes in the Army force structure toward a modular force impel the Engineer Regiment to change to stay relevant. We must continue to contribute on a battlefield that bears little resemblance to the linear, Cold War environment in which most of our engineer forces were structured to fight. Though we are busy fielding Stryker-equipped engineer companies in the Stryker brigade combat teams (SBCTs) and will develop companies as integral parts to the maneuver-based brigade units of action (UAs),[1] the bulk of our Regiment must adapt to the fundamentals of the future Army, (primarily at the unit of employment [UE] level) that call for tailored, scalable, modular, and responsive forces.[2]

Expeditionary Force Design Concept

The Regiment is exploring the engineer expeditionary force design concept as a force structure framework (Figure 1).[3] At the tactical level, the concept proposes combining engineer effects modules (EEMs)—building block elements with well-defined skills—with command and control (C2) elements into engineer mission teams (EMTs) that optimize engineer effects for a specific mission. The concept envisions a palette of EEMs that are dynamically task-organized into EMTs to fight discrete engineer engagements and then are reallocated by the engineer mission force (EMF), the headquarters that orchestrates and synchronizes their efforts, as the mission dictates.

It is a valid concept, but if it is exclusively tied to radical changes in engineer unit structure, it must overcome friction in the force development process. The long-term answer may be to make new, purpose-built engineer forces. However, a midterm solution is a mindset that engineer leaders can adopt today to employ engineer expeditionary concepts using current forces. The intellectual leap involves shedding the traditional parent organization and rigid logistical tail approach to employing engineer forces and turning available units into

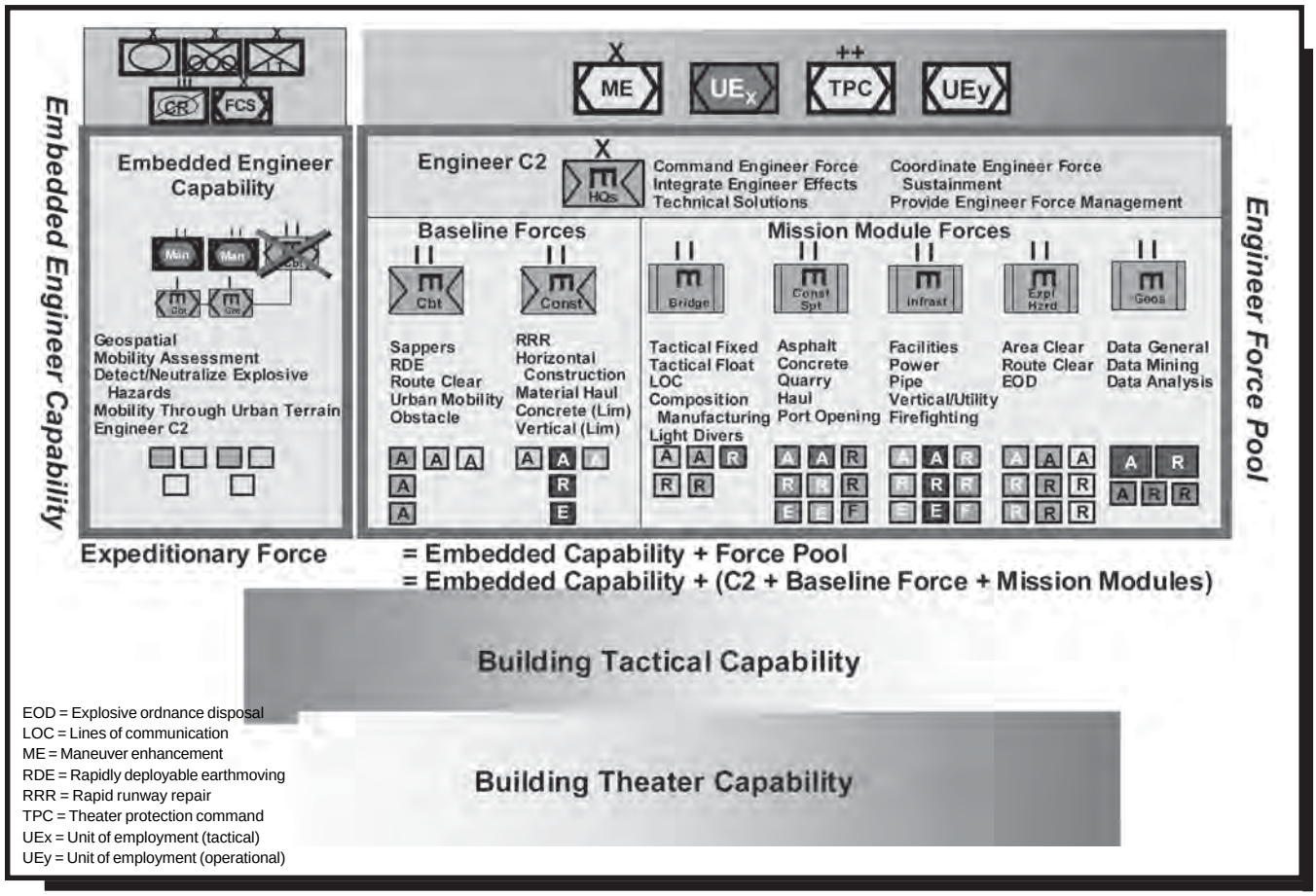


Figure 1. Future Engineer Force Framework

EEM packages that are combined into EMTs and used to fight specific engineer engagements.

During Operation Iraqi Freedom, the 555th Engineer Group led the multifunctional and multicomponent Task Force Able as an EMF integral in the 4th Infantry Division. It successfully employed engineer expeditionary concepts with traditionally organized combat and general engineering assets to execute combat missions that not only enhanced the versatility and agility of Task Force Able but increased its ability to contribute to the division's fight.

Starting in July 2003, Task Force Able aligned its forces to create a menu of C2, sapper, vertical and horizontal construction, bridge emplacement, and logistical EEMs that were rapidly combined under C2 nodes to fight specific engineer engagements and then disengaged as the mission set changed. This required adopting a revised mental map of engineer forces that transformed traditional organizations into EEMs and EMTs. For example, rather than looking at a combat heavy battalion as three combat heavy companies with a headquarters, Task Force Able created a mental map of this unit as a battalion-level C2 node, company-level EMT C2 nodes, and vertical and horizontal EEMs (Figure 2). Other units were viewed similarly. A corps wheeled company was mapped to consist of an EMT C2 node, three sapper EEMs, and a horizontal construction EEM. Though EEMs execute specific skills, early on it was deemed impractical to make them smaller than platoons, given the nature of combat operations, force protection requirements, and the need for small-unit cohesion.

From Theory to Practice

Building the Haight-Jordan Bridge

Named for two 14th Engineer Battalion soldiers who died in Operation Iraqi Freedom, the Haight-Jordan Bridge is a Mabey-Johnson float bridge, more than 300 meters long, across the Tigris River, south of Tikrit. Building the bridge included developing a connecting road network and significant road construction, as well as initiating force protection measures and field fortifications during and after construction. To accomplish this mission, Task Force Able employed engineer expeditionary concepts. A company-level C2 node was assigned the following EEMs: a horizontal construction module for earthmoving, a bridge module for bridge erection, and a combat engineer module for security and force protection. None of these units came from the same company or battalion, but represented the diversity of Task Force Able, with units from all Army components—active, reserve, and National Guard. The result was the seamless integration of all forces and a successfully executed mission. Of particular note was the C2 node that was in fact a corps wheeled company headquarters. Its task was to integrate and orchestrate the technical modules to accomplish the mission.

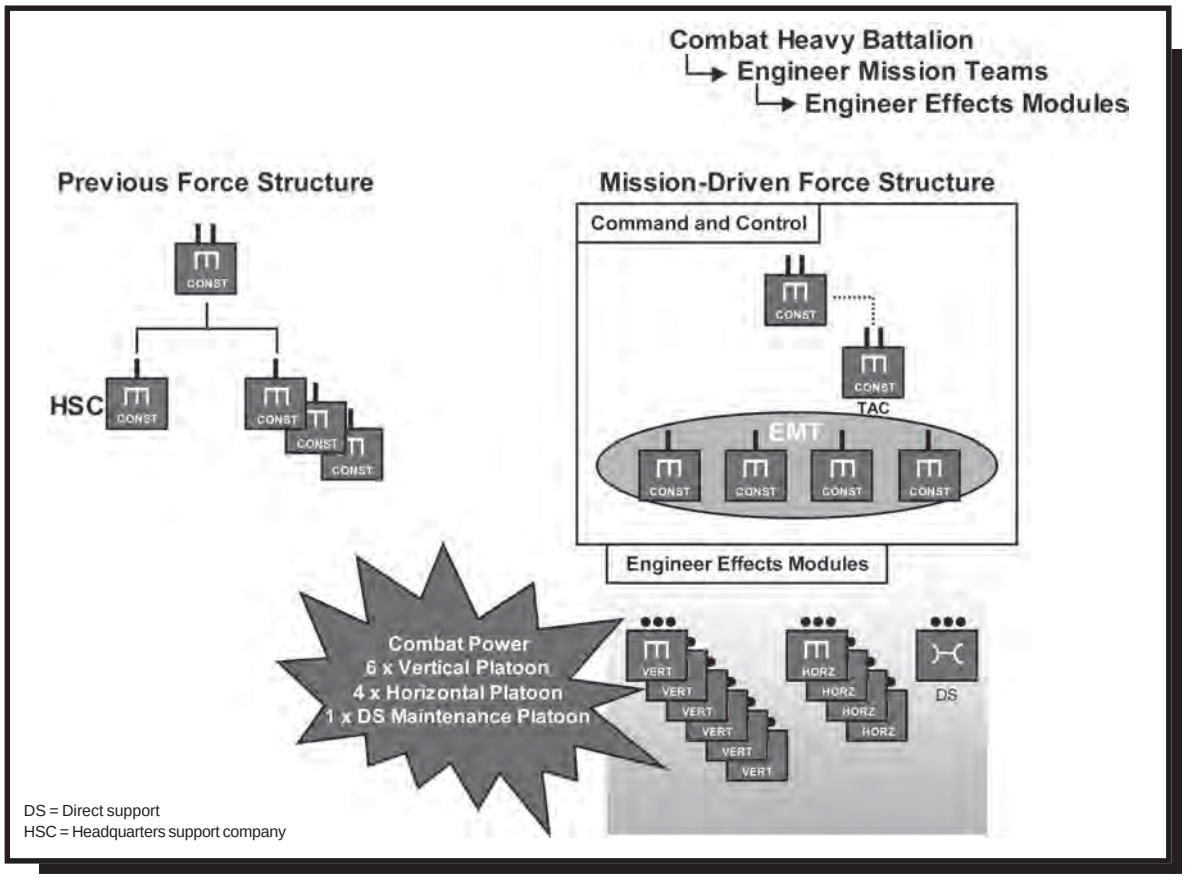


Figure 2. Mental Mapping Expeditionary Concept



Task Force Able built the Haight-Jordan Bridge across the Tigris River, south of Tikrit.

Forming Task Force Trailblazer

Combating improvised explosive devices (IEDs) along key routes within the 4th Infantry Division's area of operations made it necessary to form Task Force Trailblazer. Established around a battalion headquarters as a lieutenant colonel-level EMT C2 node, Task Force Trailblazer was formed with company EMT C2 nodes controlling mission-oriented surveillance, security, and obstacle reduction modules from multiple organizations. The C2 nodes used the modules in a plug-and-play mode that optimized their capabilities. Construction equipment platoons coordinated with sapper platoons to clear and grub roadway shoulders and medians to eliminate IEDs and discourage future emplacement. Surveillance and security modules were integrated to provide oversight and protection along the routes during clearance operations and counter-IED ambushes. The end state was fully optimized clearance packages that could be moved easily about the battlefield to respond to changing threats.

Lessons Learned–Keys to Success

Task Force Able gained early lessons learned from incorporating engineer expeditionary concepts with current engineer forces. As the task force reflects on its role in Operation Iraqi Freedom and prepares for future operations, it will continue to revise and assess these lessons.

Creating Multifunctional EMT C2 Nodes

Battalion and company leaders conducting operations with Task Force Able freed themselves from traditional, unit-specific jurisdictions. A bridge company headquarters was expected to serve not only as an EMT for bridging operations but also as an EMT C2 node for nearly any engineer operation. This gave the task force commander greater flexibility since any company could provide the C2 necessary for an EMT and, given the appropriate EEMs, complete any engineer mission. The commander could rapidly task-organize around assets that either were not engaged or were near the mission location. This became critical on a dispersed and dynamic battlefield and required great agility on the part of the company-level leaders, who had to transform from engineering specialists to engineering generalists. Clearly, this application required a touch of reality: a combat heavy EMT C2 node was best for a construction engineer mission. Yet, multiple missions were accomplished with EMT C2 nodes going "against type" in directing a variety of EEMs.

Building Flexible EEMs

Battalions and companies were charged with developing truly plug-and-play EEMs from their platoons. This developed over time, and success varied among units.

- Units must tailor their logistics and free their units from logistical constraints. The task force and subordinate battalions became adept at providing combat service support to a variety of EEMs, and moving logistical EEMs became routine. Maintenance was the toughest area to resolve. Units profited from an understanding of the maintenance requirements of all EEMs. Task Force Able relieved maintenance shortfalls by aggressive use of mobile maintenance teams and the development of transferable, EEM-specific prescribed load lists (PLLs) that could accompany units.
- Units must ensure that communications and standard operating procedures (SOPs) are compatible, consistent, and streamlined. Faced with a multicomponent force, Task Force Able had to reallocate communications assets and work hard to develop consistent SOPs and protocols that helped ensure continuity across the task force. There were hiccups, but over time an EEM from one battalion could easily work with an EEM from another battalion as part of an EMT.
- Units must establish protocols to rapidly integrate EEMs into EMTs, with the burden placed on the EMT C2 node. These bonding techniques, based on enhanced leader battlefield circulation and staff focus on integration, placed incredible demands on the unit leadership.

Preparing the Engineer Brigade for Operation Iraqi Freedom

By Colonel Don C. Young

"Engineers are everywhere! No matter where I go in Baghdad, I see engineers hard at work, doing a wide variety of missions."

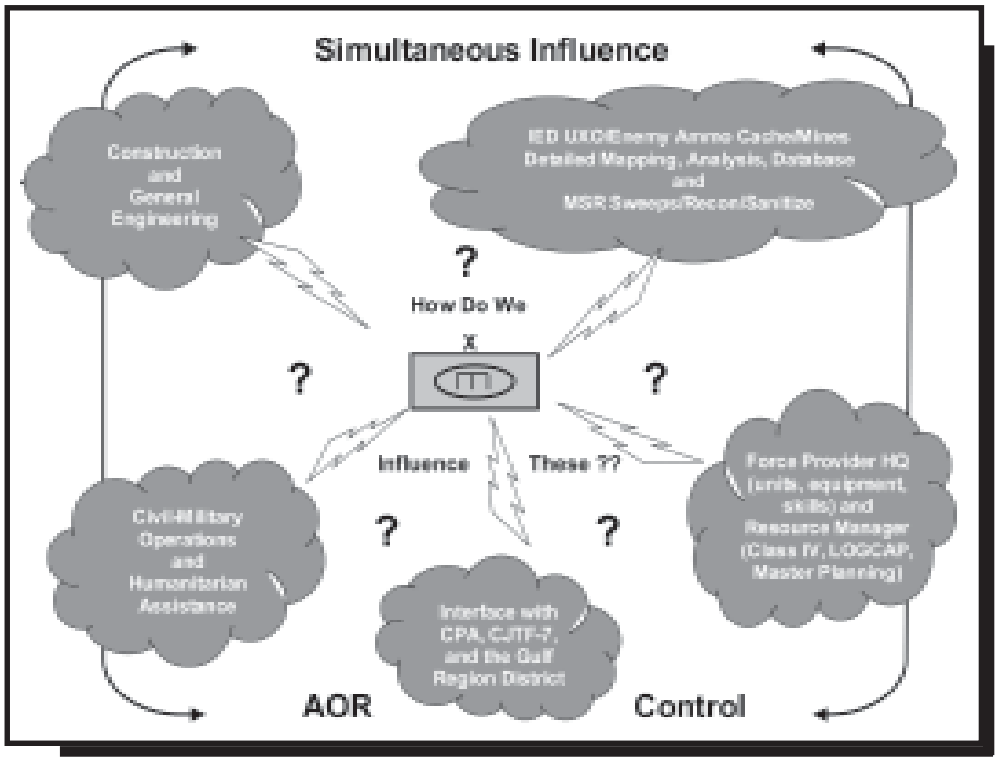
—Brigadier General Martin Dempsey
Commander, 1st Armored Division
16 July 2003

How does a unit prepare for stability operations and support operations (SOSO) missions with high-intensity conflict operations occurring daily? This article incorporates the initial lessons learned from the 1st Armored Division (1AD) Engineer Brigade operations in Baghdad and recent observer-controller trends used to prepare an engineer brigade headquarters during a division command post (CP) exercise for a follow-on Operation Iraqi Freedom-designated deployment. The article focuses on three key themes: mission areas, CP operations, and predeployment training.

Mission Areas

The figure below outlines the five baseline mission areas that an engineer brigade (or division engineer in the case of a light division) must influence for the mission success of the division. Some may classify them as "glass balls," but I would rather treat them as mission-essential task list items. This enables the engineer brigade and subordinate units such as sapper battalions and assigned echelon-above-division (EAD)/echelon-above-corps (EAC) units to conduct further mission analysis to identify the battle tasks required for engineers at all levels. These battle tasks and their information management requirements will drive the structure, operations, and systems of the engineer brigade CPs: engineer main (EMAIN), assistant division engineer (ADE), engineer tactical action center (ETAC), and engineer rear (EREAR). Once engineer leaders understand the missions of the Operation Iraqi Freedom theater and how to run the engineer CPs, they can focus the predeployment training program on the essential individual and collective tasks required for mission success.

The engineer brigade must configure itself to handle simultaneously the role of the five mission areas. Each one must be treated separately with fully assigned assets for command and control responsibility. A construction



Baseline Mission Areas Engineers Must Influence

management section (CMS) is an absolute necessity, whether augmented from a combat or construction engineer group or combat heavy battalion headquarters or fielded "out of hide" with school-trained engineer officers and senior non-commissioned officers assigned to the brigade headquarters. Also, the use of liaison officer augmentation at key locations will enhance situational awareness and parallel planning. In our case, the EMAIN often was able to inform the division main CP about engineer missions about to be assigned to the division from Coalition Joint Task Force-7 (CJTF-7)/Coalition Provisional Authority (CPA) because of the highly effective use of liaison officers. Another area of interest is contract construction completed by many different programs and "colors" of money. The key to success is the ability to access, track, and influence the division priorities with construction contracting capabilities within the commanders' discretionary funds, civil affairs, the CPA, and the Gulf Region Division.

The engineer brigade civil affairs officer (S5) pays big dividends for the EMAIN. The S5's interaction with the Assistant Chief of Staff, G5 (Civil Affairs), the division Civil-Military Operations Center (CMOC), and civil affairs units will help identify and obtain construction contracts and hard-to-get Class IV supplies. In some cases, sapper battalions are attached to their brigade combat team (BCT) headquarters. Even under this type of command and support relationship, the force provider role of supplying trained and ready forces never ends for the division engineer. Therefore, the engineer brigade commander (or division engineer) retains the essential responsibilities for maintaining engineer equipment, supplying force protection barrier material, and providing construction and additional sapper capabilities. A key element to success is sapper battalion reporting (dual chains of command) and functional area stovepipe requirements that must remain in effect to maximize engineer support across the entire division sector. The Assistant Division Commander (Support), the Division Support Command (DISCOM), and the Assistant Chief of Staff, G4 (Logistics), will also look to the engineer brigade for expertise and leadership on base camp master planning, Logistics Civil Augmentation Program (LOGCAP) contract interface, facility preparation work, and priorities for Class IV transport and issue.

One last area that the engineer brigade must take the lead on is improvised explosive device (IED) database tracking; predictive analysis; and tactics, techniques, and procedures (TTP) trend identification through coordination with explosive ordnance disposal (EOD) units, the Assistant Chief of Staff, G2 (Intelligence), the analysis and control element (ACE), and the BCT engineers. The brigade intelligence officer with All-Source Analysis System-Light capability in the EMAIN provides IED expertise throughout the division.

CP Operations

The basic layout of the engineer CPs must be structured to handle the full spectrum of combat operations. Our crossing force headquarters configuration for the EMAIN facilitated the CP expansion for this deployment. Force modernization will include the usual problems of transitioning from analog to digital systems, coupled with the challenges of transitioning CPs from high-intensity conflict to SOSO missions. Information management is the key system for ensuring success by enabling the commander to "see himself." Identifying the critical information requirements is essential to streamlining the wide variety of data that comes into a CP daily and then deciding what to do with it. One way to achieve this objective is to establish a common operational picture (COP) that aligns and synchronizes all four engineer CPs, especially for informing the division command group. It can include digital maps, but map images alone will not help the division engineer to influence the division fight. One invaluable option is the "brigade snapshot" (shown in the table on page 9). This one-page document enables the brigade commander and subordinate commanders to see themselves and to quickly outline problem areas. It drives the information management process, to include critical collection efforts. Coupled with the rolling battlefield update briefing slides and current missions on sector maps, the four engineer brigade CPs remain synchronized and focused with the same engineer COP.

Predeployment Training

Units will struggle with the mandatory Coalition Forces Land Component Command (CFLCC) and major command training requirements to be accomplished before deployment and those required during reception, staging, onward-movement, and integration (RSOI). Based on our experience in Baghdad, leaders should focus on the following "Big 8" areas of predeployment training for all engineer units:

Weapons Familiarization

Every soldier is a rifleman first. Help your soldiers become comfortable with their weapons. Go to the range as often as possible and practice reflexive fire techniques, both mounted and dismounted. Like it or not, engineers are performing a lot of infantry tasks in Iraq.

Convoy Live-Fire Training

Soldiers must be accustomed to firing their weapons while mounted. This should be practiced before entering the theater. Scenarios can include ambushes along obstructed routes, IED attacks, IED attacks followed by rocket-propelled grenade and small arms fire, attacks by single or multiple snipers, and mounted or dismounted suicide bombers. Each scenario contains a unique set of challenges and appropriate counterreactions.

Extra Crew-Served Weapons Gunner Qualification

There is always a shortage of qualified gunners for tactical movements and patrols. Double-qualify so you can continue the mission while allowing the crew to rest. Include squad automatic weapons in this effort.

Unit	EN BDE, TAD	Date	28 Jun 03	Time	1323	Location	[redacted] Iraq

Unit	TOC Grid	DNVT	Call Sign
493d EN GRP	[redacted]	[redacted]	[redacted]
94th EN BN			
389th EN BN			
203d EN BN			
671st MRBC			
1457th EN BN			
16th EN BN (TOC)			
[redacted]			
40th EN BN			
70th EN BN			
439th EN BN			
2LCR RENG			
ETAC			

Last 24 Hours – Significant Events

Unit	What	Where	When

High-Visibility Priorities – 28 Jun

Unit	What	% Complete	ECD
493d	CJTF HQ Upgrades	65	
493d	Camp Cropper Upgrade	15	TBD
40/493/1457	Zoo Opening Tasks	76	
493d	LSA Dogwood	51	20 Jul
493d	Police Station Upgrades	90	13 Jun
1457th	Police Station FP Upgrades	12	
1457th	BIAP FP Upgrades	75	9 Jul
493d	LSA Dogwood Footbridge	20	TBD
1457th	1BDE, 3ID ASR Clearance	Ongoing	TBD
493d	BIAP Master Planning	Ongoing	TBD
1457th	Tunnel Recons	64	TBD
40th/1457th	14th of July Bridge	Awaiting BOM	TBD
493d	Prefab Showers for FOBs	1	TBD
493d	PMP Replacement	5	31 Jun
493d	LOGCAP Dining Facility	15	
493d	Support to Camp Victory		
493d	Civilian Airport Opening Tasks	10	15 Jul

Today's Meetings

Who	What	Where	When
Staff	Staff Update	EMAIN	0700
CDR	501st COC		1000
S3 DPW	Mayor Cell MTG	BIAP	1100
CDR	Radio Show		1130
S3/CONSTR	Construction/Utilities	EMAIN	1400
CDR	1AD Conference Call	EMAIN	1700
XO	USACE/V-Corps VTC	EMAIN	2000

Maintenance

Vehicle Type	Avail	O/H	OR%
M113	[redacted]	[redacted]	83%
M9 ACE			87%
M548			89%
AVLB			81%
MCLIC			100%
SEE			73%
D7			83%
D9			88%
Scrapers			89%
Graders			96%
Cranes			69%
Loaders (MW24C)			81%
Loaders (175B)			70%
20-Ton Dumps			86%
5-Ton Dumps			91%
BEB			83%
Paver			0%
Excavator			80%
Fire Trucks			100%
Fork Lift 10k			89%
Fork Lift 6k			100%

Personnel Accountability

Unit	Iraq	Kuwait
Total Engineers	[redacted]	[redacted]
493d EN GRP		
203d EN BN		
94th EN BN		
535 CSE		
842d CSE		
249th EN DET		
389th EN BN		
B/142d EN		
H33/B/141 SIG		
1457th EN BN		
759th EOD		
18th EOD		
[redacted]		
439th EN BN		
HHD EN BDE		
526th EN DET TT		
518th TT		
526 SK		
671st MRBC		

Current FRAGOs

Division	Brigade
240A	FRAGO 36

UXOs/Caches

Total Engineer/EOD Effort 28 Jun 03

Unit	Reported Sites UXO/Cache	Cleared Units UXO/Cache	Cleared 3d ORD UXO/Cache	Sites Pending 3d UXO/Cache
1BCT	1/0	14/0	10/5	[redacted]
2BCT	1/0	3/0	0/2	
3BCT	0/0	0/0	0/4	
2-82d	0/0	8/0	2/0	
2ACR	4/1	4/0	5/3	
Other	0/0	0/0	0/2	
Total	6/1	29/0	17/16	

Communication Status

Unit	DNVT	SIPR	NIPR	FM	DSN
493	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
1457					
16E					
40E					
70E					
439E					
2LCR					
EN BDE					
	TACSAT	FBCB2			

Critical Class IV Status

Concertina	6720
Pickets	5661
Hesco Bastions	1159
Plywood	787
2"x4" Wood	2428
4"x4" Wood	1046
2"x6" Wood	2592
Sandbags	378240
Spike Chains	138 o/o
NJ Barriers	3
Texas T-Walls	64

Engineer Brigade Snapshot

IED/Unexploded Ordnance

Ensure that every soldier has situational awareness, the ability to recognize a multitude of devices, an understanding of force protection measures, and the TTP for enemy employment.

Antiterrorism Training

The focus is on how to design secure forward operating bases. Engineers are expected to be the experts, but few have received any training on minimum standoff distances for various IEDs and how to effectively design and emplace protective measures against vehicle and suicide bomber attacks. Capitalize on the talents and resources of the Engineer Research and Development Center via TeleEngineering or other means, when appropriate.

Engineer and EOD Interaction

Clearly define the sapper role versus the EOD role for the various types of joint missions being performed in theater.

Use of Demolitions

Validate every sapper and engineer, regardless of military occupational specialty, on demolition procedures. They will definitely use them in Iraq. Include in this training the proper manner to safely destroy captured munitions without causing second-order hazards.

Physical Fitness

Emphasize upper-body strength and long-distance runs to provide the fitness needed to endure the heat and the tempo of operations.

Mission Success

The Big 8 will pay huge dividends for your unit as an enduring foundation for a year-long deployment. Additionally, leaders must oversee focused planning to establish systems within each engineer brigade CP and to complete required cross-leveling to handle daily requirements. Consider the following areas for ensuring mission success:

- Integration of EAD engineer units into the division (task-organized Active Component/Reserve Component assets) and mission planning for other EAD/EAC engineer assets conducting a short-term mission in the division sector.
- Use of division terrain teams in support of five BCTs (urban operation products) maximized.
- Role of the ADE in the division targeting effects process and operations and plans.
- Creation of a CMS (out of hide) for the EMAIN. This must include battle-tracking techniques for contract construction and troop construction projects.
- Operation of the Class IV yard instead of leaving it to the DISCOM or main support battalion to run a division-level yard for force protection and construction materials.
- Maintenance support of construction equipment (beyond sapper unit modified table of organization and equipment [MTOE]) and special engineer equipment in the sapper battalions.
- Security, repair, and upgrade of existing infrastructure (water, power, sewer, airports, zoos, and bridges).
- Assured mobility through bridge replacement planning and main supply route upgrades.
- Predictive analysis of IED and UXO use by the enemy.
- Use of the ETAC on CPA/ CJTF-7/division priority project sites.
- Command and control of MK2 bridge boats for river patrols.
- Request for information and force request process to the next higher engineer headquarters.
- Use of the up-armored D9 and mine-clearing armor-protected (MCAP) D7 dozers (TTP).
- Use of casualty tracking/reporting (doctrinal use, as well as use of alternative channels).
- Use of EREAR manning versus rear area engineer responsibilities.
- Best utilization of an assigned engineer group headquarters.
- Use of the corps wheeled battalion across the division sector.
- Use of patrol and tactical road march briefs and operations.
- Reaction to contact (mounted and dismounted, direct/ indirect/ambush).
- Knowledge of unit basic loads and vehicle movement load plans.
- Utilization of contracting/field ordering officer/Class A agent.
- Security plans of every operation with internal engineer assets.
- Use of engineer liaison element with the U.S. Army Corps of Engineers division, the CMOC, the CPA, and attached maneuver units (beyond the normal three BCTs).

Conclusion

The Engineer Regiment is fully engaged in the Iraq theater of operations. An example is shown in the photo on page 11. It depicts sappers from a Reserve Component EAD unit—the 1457th Engineer Battalion (Corps) (Wheeled), Utah Army National Guard, task-organized to the 1AD Engineer Brigade—working on a war-damaged suspension cable on the 14th of July Bridge, now called the Freedom Bridge. The repair design was done through reachback capability to the U.S. Army Engineer Research and Development Center at Vicksburg, Mississippi, via the brigade TeleEngineering Toolkit, while the BCT sappers provided security and logistical support to the EAD unit operating in their BCT sector. Materials to repair the bridge were fabricated by soldiers from the 1457th, who have extensive military and



Sappers work on a war-damaged suspension cable on the 14th of July Bridge, now called the Freedom Bridge.

civilian experience with such tasks. This is an important point to note as Reserve Component soldiers bring a wealth of expertise from their civilian professions and experiences. The heavy-gauge cable for the repair was obtained by the 1AD Engineer Brigade logistics officer through a local vendor. Initiative and re-sourcefulness by engineer leaders focused on logistics resources are paramount in missions of this nature.

The synchronization and resourcing of engineer operations from the sapper squad to the contracting support of infrastructure rebuilding in a division area of operations fall to the engineer brigade commander (or division engineer). The current engineer brigade MTOE and doctrine must be adapted for mission success in Iraq and future theaters of operation. Operation Desert Storm in Iraq, Operation Joint Endeavor in Bosnia, and Operation Iraqi Freedom clearly outline the need for, and added value of, having an engineer brigade organic to a heavy division. We must prepare our young engineer leaders for the challenge to make them flexible for future operations as our senior leaders on the ground. They are our future and are vital to ensuring that engineers remain as superb value-added to the combined arms team. Essayons!

Colonel Young serves as executive officer to the deputy commanding general of U.S. Army, Europe. He was the commander of the 1AD Engineer Brigade from July 2001 to July 2003. The brigade tripled in size with the addition of EAD/EAC engineer units following the transfer of authority with Engineer Brigade, 3d Infantry Division, in Baghdad in May 2003. A graduate of the U.S. Army War College, he holds a bachelor's in civil engineering from Vanderbilt University and a master's in civil engineering from the Georgia Institute of Technology and is a certified professional engineer in Virginia.

("Force Design Concepts," continued from page 6.)

Training the Battle Staffs

It was essential to train Task Force Able's battle staffs to accommodate dynamic task organization to ensure that the EMTs were properly integrated and resourced. This required extensive training, and the task force developed an in-theater program—executed concurrently with combat operations—to train them. After-action reviews that focused on the application of EMF principles were essential. Units that train for a traditional, pretransformational, echelons-above-corps role were most challenged in retooling their battle staffs. However, all units made the transition.

Ensuring Cohesive Senior Leadership

Leadership at the task force and battalion levels was essential to the successful implementation of EMF concepts and the success of Task Force Able. Battalion leaders had to stop thinking in terms of "their" units, assume a broader task force identity, and become dedicated to ensuring that uniformly high Task Force Able standards were applied. All soldiers and junior leaders required coaching, counseling, and mentoring. It was a challenge to maintain unit identity, ensure that administrative actions were accomplished, and foster critical home station threads such as family readiness groups. Yet, a great result of employing EMF concepts was a more cohesive senior leadership that was extremely familiar with the breadth of task force operations.

Conclusion

As the Army moves to greater modular forces, the Engineer Regiment should not wait for radical changes in its current echelon-above-division and echelon-above-corps force structure to align itself with emerging concepts. As shown in recent combat operations, engineer soldiers and leaders are equal to the challenge. Engineer organizations, once liberated from traditional employment concepts, can embrace transformational concepts and embark on the road to more modular, agile, and responsive forces.

Colonel Toomey commands the 555th Engineer Group at Fort Lewis, Washington. He is a graduate of the U.S. Military Academy, the Naval War College, and MIT. He has had numerous command and staff assignments, to include Commander, 14th Engineer Battalion, Fort Lewis, Washington.

Endnotes

[1] *Unit of Employment (UE) Operations White Paper,* Training and Doctrine Command Analysis Center (TRAC), 23 January 2004, p. 39.

[2] Ibid, p. 12.

[3] Lieutenant Colonel Bryan Watson, *Future Engineer Force Brief,* U.S. Army Engineer School, Fort Leonard Wood, Missouri, 27 February 2004.

Support Facilities for the Future Force

By Mr. Larry Allen and Mr. Kirk McGraw

Evolving Future Force doctrine focuses on executing decisive offensive and defensive combat operations—winning the war—but little thought has been given to Future Force missions such as stability and support—winning the peace—and to operational support facilities[1] needed at all levels of conflict. The logistics community will doctrinally drive support facility requirements. The U.S. Army Corps of Engineers will drive site selection, construction technologies, and environmental concerns. The U.S. Army Maneuver Support Center (MANSCEN) schools—Engineer, Military Police, and Chemical—will drive the doctrine, organization, training, materiel, leader development, personnel, and facilities (DOTMLPF) requirements for site selection, construction, environmental concerns, and all aspects of protection for these facilities.

This article attempts to translate current and past force requirements for base camps and supply depots into the context of the still-evolving Future Force. By doing so, requirements for future support facilities[2] can be determined and provided for as the Future Force evolves. As the Future Force gains more definition, the true requirement for future support structures will also gain more definition. The purpose of this article is to start discussion about Future Force support facility needs.

A Historical Perspective

Armies have always needed and used base camps and supply depots. Valley Forge was a base camp where General George Washington's men wintered over to wait for better fighting conditions. City Point, Virginia, was General Ulysses S. Grant's supply depot for the Battle of Petersburg. Base camps and supply depots were located all across Vietnam, and the Army is using base camps today in South Korea, Kosovo, Bosnia, Afghanistan, and Iraq.

Base camps and supply depots served four basic purposes for past armies:

- Buildup, drawdown, and stockpiling.
- Lodging and planning (to include beddown and feeding).
- Protection.
- Cultural separation (for example, separating American troops from defeated adversaries, such as Germans at the end of World War II, or from different cultures, such as American troops in the Muslim world today).

While each of those tasks might be handled without them (the British commandeered civilian housing during the Revolutionary War, for example), base camps provide the best overall solution.

The Future Force

As a "joint force," the Future Force is compatible with the Air Force, Navy, and Marine Corps. The joint force concept is more than a simple deconfliction of service-specific operations. It is the "warfare of combinations" extended beyond a single service and reaching down to the tactical level. This implies interoperable forces within each service for operational efficiency and interdependent forces among services for maximum effectiveness when combined. These forces are focused on leveraging the best potential tools of speed, operational reach, staying power, and precision offered by the strengths of each service. The very nature of "jointness" must be rooted in trust and commitment among the services.

As an expeditionary force, the Future Force goes beyond rapid deployment on short-duration missions. There is also a critical endurance aspect to our expeditionary force mindset. It must be both responsive to crisis and capable of sustained engagement—able to fight at multiple points on arrival, particularly in the austere environments that will likely be the norm. An expeditionary force can contend with the uncertainty over when and where it will be deployed and what it will be asked to accomplish. It is comfortable fighting for information versus depending on fighting with information. It is made up of adaptable formations and operations, not trained and equipped for a known array of predictable threats. An expeditionary force can contend with profound changes in the context and character of the conflict.

The Future Force is designed to fight with minimal forces, but with maximum technology that tracks friendly and enemy operations. This will allow the Future Force to identify the threat and reduce it almost simultaneously. Future Force concepts project at most a medium, unified force with light, highly lethal, highly dependable weapons systems. Heavy forces will not be required.

Army plans for the Future Force call for rapidly deploying a modular force into a theater of operations ready for combat, where it will then engage in short, high-intensity fights enabled by its superior lethality and situational awareness and understanding. The Future Force will bring everything it

needs, eliminating the need for a buildup of supplies, personnel, and equipment. It will develop the situation out of contact, either at its home station or en route. This will allow it to "see first, understand first, and act first" through superior intelligence, information management, and collaborative planning. It will finish decisively by executing strategic and/or operational maneuver to strike the enemy's center of gravity at the decisive time and place. This force will be able to engage in combat operations 30 minutes after landing and sustain itself for a number of days during combat operations. During this time, the unit of action (UA) will be self-sustaining until it can replenish in stride or rotate to a "UA recycling point" provided by the next higher organization, the unit of employment (UE). The UE supplies subordinate UAs through multiple entry points within its operating radius and with a 48- to 72-hour planning horizon. The UE accomplishes force protection through decentralized, highly mobile operations occurring along multiple routes, relying on superior situational awareness and understanding, maneuverability, and standoff engagement. Future Force support facilities are to be pushed back at least to intermediate staging bases (ISBs) and optimally to the continental United States.

Need for Support Facilities

The Future Force logistics concept emphasizes velocity over mass, meaning that an agile, high-speed inventory in motion will be used rather than building large in-theater stockpiles. The Future Force will be resupplied and sustained during additional combat operations through "pulsed logistics" rather than by conventional, linear techniques. These operational parameters imply that the UE must be able to rapidly identify potential sites for critical command and control and sustaining nodes and develop a sustainment infrastructure with so little effort and materiel that it can be abandoned if need be.

But there are reasons why support facility contingency plans should be incorporated into each operations plan:

- Until the entire Army is modernized to Future Force standards, including reserve, maneuver support, and maneuver sustainment elements, support facilities will be needed to support the current force modules, including joint forces. For example, the Army is charged with providing supplies to Marine Corps forces ashore for any duration over 30 days. Also included are our allies and other coalition forces. Each will require support facilities for their operations if they are not at Future Force standards. Standard reception, staging, onward movement, and integration (RSOI) protocols would apply in these cases and may for some time bleed over into the Future Force.
- It may be necessary to use support facilities to redeploy forces, liberate a country, or sustain postwar recovery efforts by using them as training facilities to reestablish a police force or military in the country. U.S.-led conflicts may devolve into occupation (in the case of Germany and Japan at the end of World War II) or long-term support (in the case of South Korea) and almost always devolve into reconstruction. Unless that reconstruction is to be performed entirely by contractors (and given the nature of postconflict casualties in Iraq, that is unlikely), then certain Army and joint forces will be needed to perform or supervise that reconstruction. While it can be argued that the Future Force will surgically remove the threat with precision effects without creating mass damages from war operations, that has not been the case in Iraq, where weapons with accuracy approaching Future Force precision were used. Further,



Advanced technologies will reduce site preparation time and logistics requirements, enabling support elements to keep pace with maneuver units.

adversaries may not feel constrained to limit damages and could adopt a scorched-earth policy.

- The current force corollary to the Future Force UA is the small, self-contained force, such as Army Special Forces and Navy SEALs. These forces do not need support facilities when they are in the operational environment, but they do need support facilities located in safe havens for planning and resupply. The Future Force is likely to follow this pattern, but with endurance as a core competency, for up to 72 hours. Units will then be cycled out of the fight for replenishment, and it is neither practical nor desirable to expose exhausted troops to a long march back to their point of entry (which may not be controlled).
- There are finite numbers of aircraft and ships available for force projection missions. Rather than increasing during a conflict, this number is likely to go down as other needs arise and as damage occurs. Maintenance also drives the number of aircraft and ships available and is directly proportional to their use. The more sorties flown by a C-17 and the more landings it makes on primitive or unimproved airfields, the more maintenance will be required on that aircraft. Navy vessels have similar constraints. For those reasons, the Air Force will want improved airfields and the Navy will want improved ports and harbors as soon as possible, thus leading to the development of support facilities for security, storage, and maintenance. Air Force RED HORSE and PRIME BEEF units are not configured for large-scale construction efforts. Construction is, and will probably remain, an Army responsibility. The Army is also responsible for port construction.
- The requirement to care for enemy prisoners of war (EPW) and displaced persons will continue to require support facilities.
- The scenario of the fight may change after arrival, creating the need for a longer stay and for a support facility.
- Not all battles, conflicts, or wars will end quickly, thus establishing the need for support facilities for efforts such as military operations other than war and foreign humanitarian assistance.
- If the goal of an effort is a regime change, then additional assistance will be needed to fill the ensuing vacuum and to help ensure the success of the new regime.

What Might Be Needed

There will be a constant need for force beddown, logistics support, medical treatment, internment, and refugee holding facilities to sustain Army operations in the contemporary operating environment. Currently, with few exceptions, this sustainment infrastructure must be in place or in the process of being built before any force deployment and must remain in place to sustain operations. As the force transitions to the Future Force, there will still be a requirement for sustainment infrastructure before or during any force deployment. This up-front requirement will decrease as the Army transitions to the Future Force because of its embedded sustainment capabilities. However, it is likely that the Future Force will always require some form of in-theater infrastructure to sustain operations. Otherwise, where would EPWs be interned and refugees be sent? What about logistics support to multinational or coalition forces not organized along Future Force lines? Where will the pulsed logistics support originate, and how will it meet customs requirements to redeploy? That is not to say that support facilities will not change from today's norm. These facilities must be scalable, must reduce the logistics tail, must consider the environment, and must leverage technology to develop solutions out of contact. They are most likely to be built and maintained by military engineers and contractors. To enable the Future Force, there will be varying levels of support facilities. Existing facilities will be used where available; and where they are not available, tentage and other temporary structures will be used. Only in the direst of circumstances will new construction take place.

The largest support facility would be an ISB, a 10,000- to 20,000-person installation in a relatively safe location with a high level of infrastructure, heavily supported by contractors. This would be the most permanent of the three levels of facilities, and would use existing facilities if possible. If that is not possible, then temporary facilities would start with tentage and range upward to more permanent construction such as Force Provider modules, Southeast Asia (SEA) huts,[3] trailers, containers, concrete masonry units, and existing buildings. Examples of these ISBs from past experience include England serving as the staging area for Allied forces preparing to invade Europe in World War II, Okinawa serving as a giant supply depot for the Vietnam War, and Saudi Arabia providing support facilities for Operations Desert Shield and Desert Storm.

A much smaller type of support facility could be called a forward operating base (FOB). Because the surrounding population might not be friendly, these facilities would need to be as self-sufficient as possible. These 100- to 200-person temporary installations would be small fortresses with high levels of self-sustaining infrastructure and might be located in unstable locations for peacekeeping and other operations.

The most flexible type of support facility might be called a forward operating location (FOL). These locations would be flexible 50- to 500-person temporary facilities in the battle zone but not near openly hostile areas. Very light temporary shelters and a tight sensor perimeter would characterize them.

Each of these facilities (and they probably are not limited to just three types) will likely change over time. Facility design and construction will be governed by the time available, the size of the force supported, and the duration of operations. The size of the engineer force available will also be factored into design and construction standards. Initial entry might require a number of FOLs to control key objectives. These would change over time into larger establishments with more facilities and creature comforts. What would distinguish them from today's norm would be their ability to be moved from one site to another as the situation dictated. As has been seen in

Iraq, overhead protection from mortars and rocket-propelled grenades is likely to remain a constant.

Technologies must be developed that will enable the UE to quickly and flexibly establish support facilities. These technologies will reduce logistics requirements by selecting sites that best meet unit-tailored requirements and provide modular, lightweight, redeployable shelter systems and minimize site preparation. This will allow the Future Force to—

- Generate a set of sites ranked according to the commander's priorities, such as force protection, proximity to water, and availability of construction materials and equipment.
- Develop a mission-specific site plan with integrated force protection.[4]
- Construct lightweight, low-cost, all-weather shelters using innovative techniques such as thin-shell composite structures that provide SEA hut performance characteristics with a fraction of the resources. The technical challenge is to identify material solutions meeting functional criteria such as cost, weight, density, and fire rating and construction criteria such as low effort, modularity, and redeployability.

Future support facilities are likely to share a number of characteristics. They may—

- Be joint.
- Be expeditionary.
- Have a smaller footprint.
- Be dispersed.
- Be relatively self-sustaining, capable of independent operation with built-in water production, power production, and waste treatment/disposal independent of local materials and labor.
- Be quickly erected modular designs.
- Require minimal site preparation.
- Be mobile, with minimal lift/transportation assets or organic means.
- Have plug-and-play modules capable of rapid expansion, contraction, and upgrades.
- Be rapidly assembled and disassembled by a small workforce or remote-controlled robots.
- Have built-in force protection, to include sensors, self-defense capability, lethal and nonlethal weapons; passive force protection measures such as standoff distance, dispersion, barriers, and overpressure protection against chemical, biological, radiological, and nuclear hazards; and perhaps be capable of providing their own 360-degree hemispherical protection, to include protection for fuels, munitions, and aircraft.
- Be capable of incorporation with existing structures.
- Use local materials and labor where they are available.
- Be environmentally friendly, to include self-contained waste treatment plants and "cradle-to-grave" site management.
- Be able to incorporate modern inventory control techniques, such as just-in-time arrival and throughput with minimum storage of supplies.
- Be able to provide sustainment support to the force immediately upon entry into the theater.

Conclusion

The Future Force will provide capabilities unmatched by today's Army. It will be a highly flexible, mobile, and lethal force on tomorrow's battlefield. But its centerpiece will still be the service member, who requires periodic rest to maintain the edge provided by superior technology. Support facilities will adapt to Future Force needs and those of the geographic location, proximity to the fight, and expected longevity. But the Future Force will not succeed without support facilities to repair battle damage, rest troops, and sustain noncombat operations. That is why it is so important that we start today to define the Future Force's support facility needs.

Mr. Allen is the research program liaison from the Engineer Research and Development Center to the U.S. Army Engineer School and the Maneuver Support Center. He holds a bachelor's in public administration from Southwest Missouri State University at Springfield and a master's in journalism from the University of Missouri at Columbia. He is a graduate of the U.S. Army Command and General Staff College, the National Security Management Course of the National Defense University, and the Army Management Staff College. He served with the 4th Infantry Division in Vietnam and with the 1st Infantry Division in Germany.

Mr. McGraw is the Project Manager for Forward Facilities Footprint Optimization at the Engineer Research and Development Center's Construction Engineering Research Labortory. His current research areas include remote-sensing technologies, site selection, base camp planning, and Class IV (construction) planning factors. He holds bachelor's and master's degrees in mechanical engineering from the University of Texas at El Paso.

Endnotes

[1] Just as the UA and UE concepts provide a way to look beyond current force structure, the term "support facility" is used in this article to describe Future Force base camp and supply depot requirements.

[2] In conjunction with this discussion, the issue of airfield improvements may require a forward presence before entry to improve airfields to the minimum acceptable level for Air Force certification.

[3] SEA huts were first designed for the Vietnam War.

[4] This could require reachback to U.S. Army Corps of Engineers assets (field force engineering) to assist with site layouts requiring minimal construction effort. Constraint-based layout techniques will support dynamic reconfiguration to account for the effects of terrain.

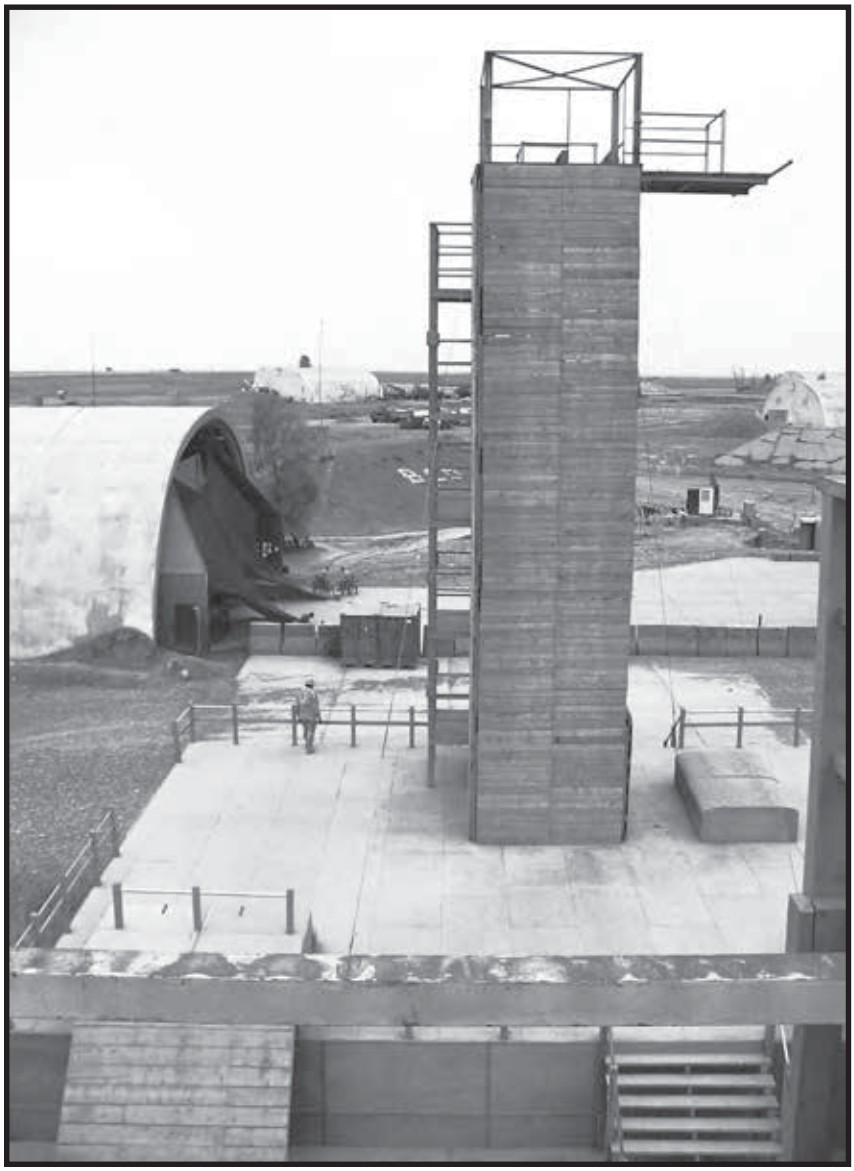
The Tale of Two Towers

By First Lieutenant Ryan J. Johnson

Charlie Company, 52d Engineer Battalion (Heavy), attached to 1st Brigade Combat Team, 101st Airborne Division, received the mission to build two rappel towers for the division's Air Assault School at Qayyarah West (Q-West) Airfield, Iraq. Charlie Company is an Army Reserve unit with headquarters and two platoons at Fort Carson, Colorado, and a detachment that includes earthmoving and maintenance troops located at Santa Fe, New Mexico. The company's 2d Platoon (with help from the maintenance troops) had six weeks to design and construct the towers. The goal was to replicate the tower at Fort Campbell, Kentucky, but resources and time would not permit that. Instead, the engineers used an existing tower for the main tower and pieced together a smaller tower from a container express (CONEX) frame and a radar dish housing.

Every rappel tower must have a solid foundation to withstand the forces that act upon it. The foundation of the existing tower was two flatbed railcars positioned side by side. The tower sat on two 9-inch steel I-beams that connected the rail cars. This foundation seemed solid, yet when the engineers first saw the tower, it was 45 feet off the rails. The railcars, and hence the tower, had to be moved back into position. Using three D7 dozers and a heavy expanded-mobility tactical truck (HEMTT) wrecker, the platoon moved the railcars back onto the rails without damaging the tower. At this point, Charlie Company's design team ensured that the tower was structurally sound before making any modifications.

The tower was fabricated using 6- by 6- by 1/4-inch angle iron with both pinned and fixed connections. The four vertical members were welded at the base to the 9-inch I-beams that connected the two railcars. The tower consisted of five sections that were 9 feet 10 inches by 8 feet 8 inches and connected by steel plates with bolted connections. Each plate consisted of eight 1/2-inch-diameter bolts, where two plates connected two vertical members. Cross-bracing and horizontal members between each section were 2- by 2- by 1/2-inch angle iron. After a visual inspection and mathematical structural analysis, leaders decided to use the existing tower as the starting point for the main tower.



Charlie Company, 52d Engineer Battalion, completed this 43-foot main tower for rappel training at Q-West Airfield, Iraq.

Many modifications had to be made. To prevent the tower from moving, the railcars were welded to the rails, the brakes were welded closed, and the tension cables were refastened and tightened. Before any construction could take place, the design team had to ensure that the tower would not tip over from the wind or the force of rappelling students. Leaders found the tower to be sufficiently supported by the railcars.

As these modifications took place, the design team worked to complete the tower. The first area to be addressed was the wooden stairs, which had to be strong and safe. A zigzag design with a landing between each flight ensured that the least space possible would be used. The vertical members were 4- by 6-inch rough-cut lumber joined by a 1/2- by 18-inch steel pole through the center of each member with a 2- by 6- by 18-inch lumber splice on each face. The stair risers and treads were cut from 2- by 10-inch material. At completion, the system consisted of 11 landings with 12 sets of stairs.



The completed 30-foot rappel tower has two free-fall sides.

The landing area needed room enough for the rappellers to land and for the belay person to maneuver. The problem was that the railcar was 5 feet off the ground and did not provide enough space for soldiers to maneuver. The solution was to build a platform on top of the railcar that would accommodate students and instructors. The design for the platform was similar to a deck raised off the ground, with reinforcements in the landing areas. The main deck rested on 4- by 4-inch studs spaced every 4 feet with 4- by 6-inch stringers and 2- by 6-inch floor joists. The joists were spaced at 16 inches on center except for the landing areas, which were spaced at 12 inches on center. The completed deck measures 45 by 58 feet and is enclosed by handrails, with stairs leading up both sides of the deck. Soil was pushed up along the other two sides of the deck so that soldiers would have adequate room to run off the ropes without fear of falling over the side.

After the tower, stairs, and landing areas were built, the top platform and sides of the main tower were constructed. Two sides of the tower were planked with 2- by 6-inch material for rappel familiarization. One side was to be a free-fall side that simulated rappelling from a CH-47 Chinook helicopter. The top platform had to accommodate six soldiers at a time, so each side had two sets of primary and secondary hookups. In addition, the free-fall side needed to extend at least 8 feet from the side of the tower to ensure that soldiers would not collide with the tower. Welders from the maintenance section constructed a top platform using salvaged materials. Five-inch I-beams were welded into place to mirror the shape of the existing top platform. The extension for the free-fall side was fabricated into this new platform, and then the entire platform was raised into position using a crane. Once the new platform was welded to the existing platform, it was covered with 2- by 10-inch lumber on its weak axis to provide a nonslip surface. To ensure safety, a double rail system was placed around the platform. These modifications completed the main tower and provided a good start toward completing the mission.

The next phase of the project was to enhance the rappel site by adding a second tower. The original plan included a 30-foot planked rappel side with a 20-foot inclined ramp to practice rappelling techniques. The material used was gathered from six radar dish housings. Each housing was 11 by 8 by 8 feet. The plan was to weld the housings together, then weld the ramp to the combined dish housing. However, the cadre arrived at Q-West and brought some changes to the project. They liked the main tower, but instead of a large inclined ramp protruding from the smaller tower, they wanted two smaller inclined ramps attached to the deck that had already been constructed.

The biggest change, however, was to have two free-fall sides on the 30-foot tower. The radar dish housings were



Charlie Company's maintenance personnel place the top platform of the main rappel tower.

discarded, and new materials were added. Charlie Company scoured through wreckage left behind from the first Iraqi war and found materials that would be much stronger. The main structural support of the tower is a 20- by 8- by 8-foot CONEX frame standing on end. Three sections of 6-inch-square tubing with 1/4-inch-thick walls made up the entire frame. This did not produce the required 30 feet of height, so Charlie Company used one of the radar dish housing units for the additional 10 feet. Even the design team felt it would be a tough job to stack the housing unit on top of the CONEX frame, but the plan came together ahead of schedule. The radar dish was welded to the frame, and reinforcement was added to support the structure. The company's maintenance troops worked many hours salvaging pieces of steel from other radar dish housings to use as reinforcement splices. In addition, they had to construct a stronger foundation to prevent tipping.

The only foundation for the CONEX frame that formed the base of the tower was the concrete it rested on. Its own mass would not be enough to support the structure once forces were applied to it, so a foundation was designed that would be structurally sound without sacrificing maneuvering space or height. The solution was to fabricate 15-foot extensions from each side of the tower and case the extensions in a concrete pad. Soldiers welded 5-inch I-beams to the base of the tower and placed 12 inches of concrete over the entire extension area. Now that the tower stood 30 feet tall, it needed stairs to take soldiers to the top.

The stairs were almost a mirror image of those at the large tower and went up in just a third of the time. The real difference in the second tower was the top platform. The cadre wanted two free-fall sides and no planked sides. The maintenance personnel had no problem fabricating a top platform that would allow four students to hook up at a time. Each free-fall side had primary and secondary hookup points with a bar running across the hookup point to simulate a CH-47 Chinook helicopter. The hookup points, each handmade so that a snap link could be inserted without damaging the rope, were also fabricated from scrap metal found at the Q-West Airfield. Customized fabrication was a recurring theme throughout the project due to the time constraints and lack of available materials. Charlie Company's soldiers had the ability and knowledge to fabricate all the parts needed to accomplish the mission.

Charlie Company had experience in tower construction from a previous mission for Joint Task Force-6, but the learning process was intense for this mission. However, the long hours and hard work paid off when the first class graduated from the Air Assault School at Q-West. When the school went back to Fort Campbell in December 2003, more than two thousand soldiers had earned their air assault wings while deployed to a combat zone in Iraq.

First Lieutenant Johnson deployed to Iraq in April 2003 with the 52d Engineer Battalion, Fort Carson, Colorado, which was attached to the 101st Airborne Division (Air Assault). He graduated from the United States Military Academy with a degree in civil engineering and is a graduate of the Engineer Officer Basic Course.

Iraq Museum Reopens

By Staff Sergeant Conrad College

U.S. soldiers and Baghdad University staff, faculty, and students mingled on 3 December 2003 at the university's Bab Muadham campus for a historic day. The Iraq Museum of Natural History was reopened, a new Internet café began serving patrons, and a refurbished child care center for staff and faculty opened its doors during the ceremonies.

The three projects were a cooperative effort of the Coalition Provisional Authority (CPA), the Ministry of Higher Education, the University of Baghdad, and the U.S. Army. The renovations are part of an ongoing effort by the coalition military, the CPA, and the U.S. Agency for International Development to rebuild Iraq's educational system.

The 16th Engineer Battalion, 1st Brigade, 1st Armored Division, was in charge of the three projects, which took about six months to complete. The Army provided more than $10,000 for the work.



Iraq Museum of Natural History

Looters had badly damaged the museum, stealing or breaking displays, fixtures, and every piece of glass. Many of the exhibit cases are still empty. Iraqi contractors were hired to repair the facility, replacing broken glass and missing fixtures to allow the museum to restart its role in scientific research and public education. As part of the recovery process, the museum has established relations with American and British natural history museums.



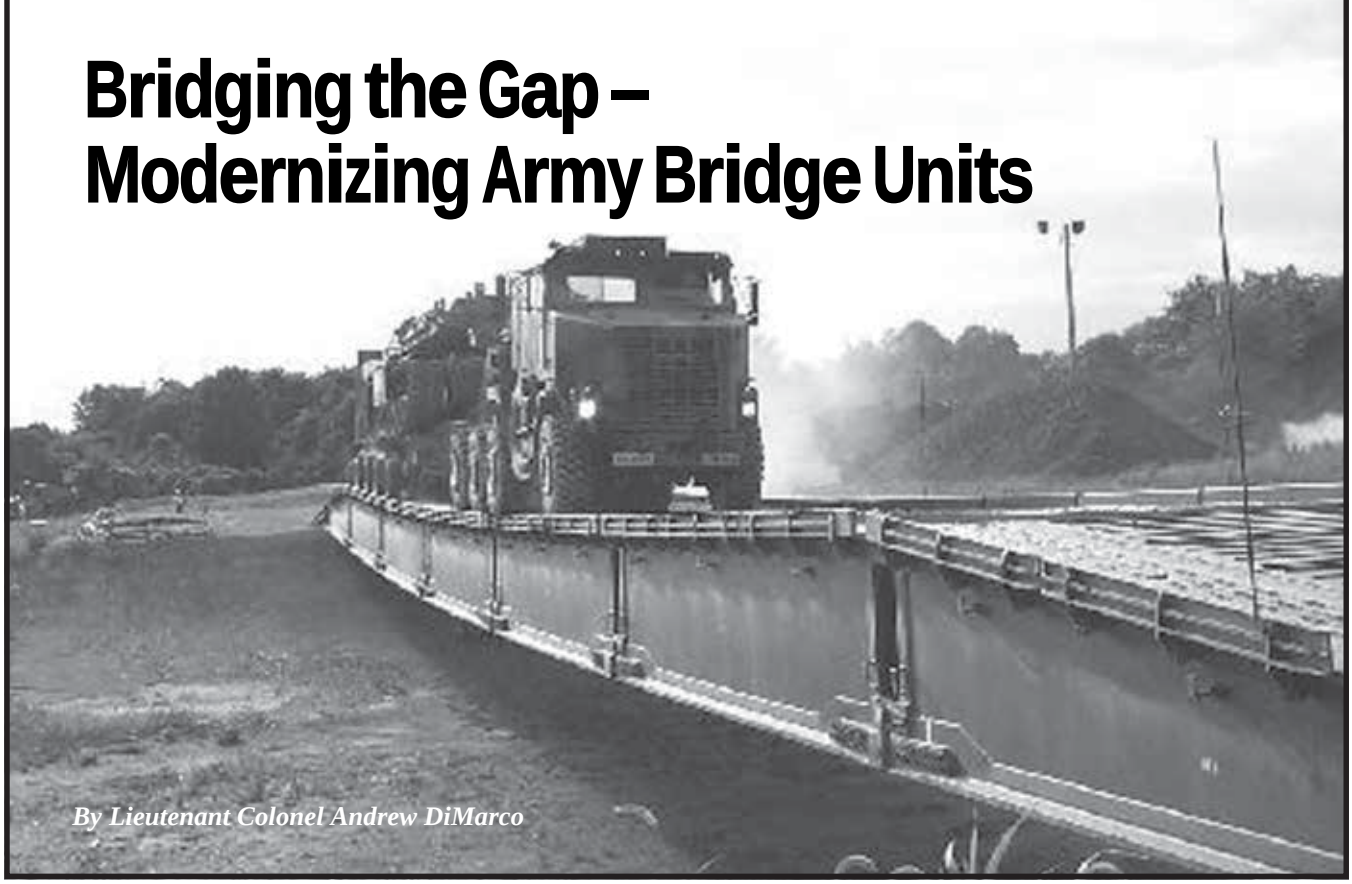
Museum reopening dedication ceremony

There was no Internet café at Baghdad University before coalition forces arrived. The CPA and the Ministry of Education provided $40,000 for the computer equipment and Internet satellite service, and local contractors were hired to refurbish the building. There are now 20 new computer stations in the café, which will provide a link for students to the rest of the world.

More projects are underway. Coalition forces are working with the Ministry of Higher Education to improve schools throughout Baghdad. A number of schools still require repairs and renovations, and there are still books to be printed and delivered.

Staff Sergeant College was a public affairs noncommissioned officer with the 372d Mobile Public Affairs Detachment, based in Nashville, Tennessee. He has a master's in journalism from Ball State University.

Bridging the Gap – Modernizing Army Bridge Units



By Lieutenant Colonel Andrew DiMarco

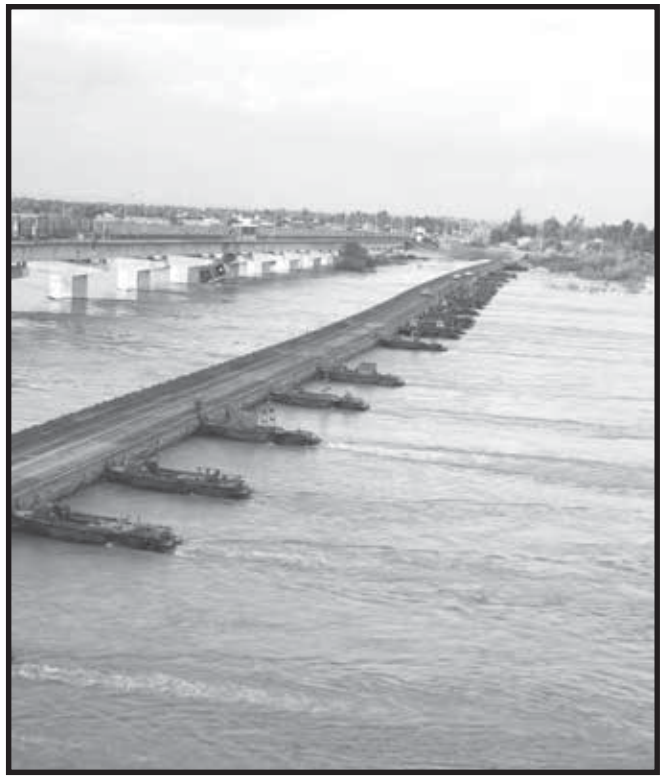
In early 2003, the Program Manager for Bridging began fielding two new bridge systems to the Army's multirole bridge companies (MRBCs): the improved ribbon bridge (IRB) and the dry support bridge (DSB). Both systems are integral components of the MRBC's objective capability.

The Army designed MRBCs to give commanders a flexible and adaptable unit that can accomplish both float- and fixed-bridge missions, are 100 percent mobile (every bridge load has a prime mover), and take advantage of product standardization. MRBCs are being upgraded with the common bridge transporter (CBT), which is a variant of the heavy expanded-mobility tactical truck (HEMTT); palletized load system (PLS) trailers; and standard PLS flatracks. Every bridge load, whether it is related to the IRB or the DSB, is palletized so that any CBT or comparable load-handling vehicle could carry, deliver, or reposition palletized bridge loads. MRBCs are optimized to conduct simultaneous fixed- and float-bridge operations.

Improved Ribbon Bridge

The IRB system provides enhanced capabilities to the MRBC by increasing military load class (MLC) capability from MLC 60 tracked (T) to MLC 80T/110 wheeled (W) in water speeds up to 10 feet per second (about 6 miles per hour). This system is a one-for-one replacement for the improved float bridge (IFB), which is reaching the end of its service life. The system is composed of M16 ramp bays and M17 interior bays that can be interconnected into rafts or bridges over nonfordable water gaps. Each MRBC is authorized 30 IRB interior bays and 12 IRB ramp bays, providing 210 meters of bridging.

The IRB is deployed in a manner similar to its IFB predecessor, and the new system is fully interoperable with CBTs, PLS trailers, bridge-erection boats (BEBs), and supplementary sets. The IRB also interoperates with the IFB and the German float-bridge system, but at reduced MLC ratings.



Improved Ribbon Bridge in Iraq

While dimensionally similar to the older IFB, the IRB is a new design with internal and external enhancements. Both the ramp and interior bays feature an aluminum strong-back forging to increase load-carrying capability, and the IRB ramp bay—

- Has a contiguous ramp end, thus eliminating the IFB's throw ramps.
- Incorporates a hydraulic pump that uses a biodegradable fluid.
- Can reach bank heights of more than 2.5 meters, providing access and egress improvements over the IFB.
- Has a deck width of 4.5 meters, allowing two-way traffic for smaller vehicles for the first time.

The IRB is externally transportable by CH-47 Chinook and CH-53 Sea Stallion helicopters and internally transportable by C-130 aircraft when partially dismantled. The IRB can use the existing anchorage system from supplementary sets for long-term placement.

The IRB program is in full-rate production after having achieved type classification standard and a full materiel release during May/June 2003. The Program Manager for Bridging fielded 126 IRB bays to the 74th, 502d, and 814th Multirole Bridge Companies before they deployed to Southwest Asia. These units successfully used the IRB system throughout Iraq.

Dry Support Bridge

The M18 DSB system brings a revolutionary change to the MRBC. The DSB relies on a mechanical system to significantly reduce soldier effort and improve operational capability to the force. The DSB replaces the medium girder bridge (MGB), while doubling the gap-crossing capability of each MRBC. It is intended to fill all 40-meter-or-less, dry-gap bridging roles from the brigade rear to the communication zone ports in a variety of tactical situations.

Each MRBC is authorized four DSB systems, each consisting of a PLS-based launch vehicle and a modular bridge that can span gaps up to 40 meters. A crew of eight soldiers can transport the entire system and deploy a 40-meter bridge in 90 minutes or less. Bridge loads are modular and palletized onto seven flatracks that are transported via organic CBTs and PLS trailers. Soldiers can also construct two shorter bridges, up to 22 and 28 meters long respectively, from each DSB system.

The M18 DSB system is composed of two subsystems, the M1975 launcher vehicle and the M19 DSB. The M1975 uses a hydraulically operated launch system integrated onto a standard PLS chassis and a set of launch beams that is carried as a separate palletized load. A launch beam is cantilevered over the gap that supports the bridge as it is built and projected across the gap. The labor required to emplace and remove the bridge is significantly reduced by the use of an integrated, materiel-handling crane, as well as by the ability of CBTs to maneuver the palletized bridge loads around the construction site easily.



Dry Support Bridge

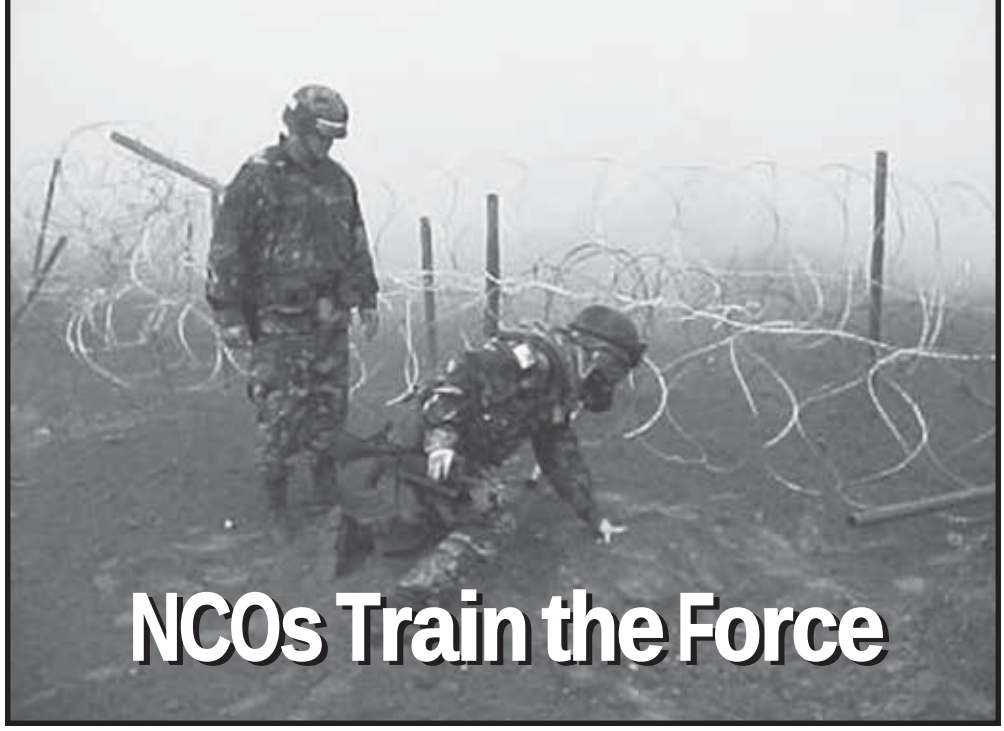
The M19 DSB is a modular, all-aluminum bridge. Although some of the components seem similar in design to the MGB, the number of components has been drastically reduced and the bridge is a new design. A 40-meter bridge consists of 2 ramp modules, 5 parallel modules, 2 end beams, 20 approach ramps, and 24 bridge pins. Each module has curbs and drivers' aids integrated into it, and modules fold up onto themselves for transportation. The bridge has a 4.3-meter roadway and supports MLC 80T/110W. The bridge is also fielded with a new anchorage system for longer-term use. To further reduce labor requirements, the anchorage system features an onboard pneumatic hammer, which is powered via standard connections to the launcher vehicle or organic CBTs.

The DSB program transitioned into full-rate production in May 2003 and attained full materiel release in June 2003. The Program Manager for Bridging fielded four DSB systems to the 74th Multirole Bridge Company in February 2003 just before its deployment to Southwest Asia, and the system successfully supported operations there.

Summary

Additional information on the IRB and DSB systems, as well as other systems managed by the Program Manager for Bridging, can be found at the Army Knowledge Collaboration Center or at *<http://peocscss.tacom.army.mil/pmbridging.htm.>*

Lieutenant Colonel DiMarco is the Acting Product Manager for the Unit of Action Reconnaissance, Surveillance, and Command and Control Vehicles within the Program Management Office, Unit of Action. His past assignments include Assistant Project Manager for the Dry Support Bridge System; Department of the Army Systems Coordinator for the Assistant Secretary of the Army for Acquisition, Logistics, and Technology; and company commander, 62d Engineer Battalion. A graduate of the Army Command and General Staff College, Lieutenant Colonel DiMarco is Program Management Level III-certified and holds a master's in systems acquisition management.



NCOs Train the Force

By Captain Maycros I. Baez

"United States Army Forces Command (FORSCOM) mobilizes, trains, prepares for deployment, and deploys units required to expand the Army to meet commander in chief (CINC) requirements. When directed, FORSCOM demobilizes units no longer needed to meet war or other national emergency requirements."

—FORSCOM/ARNG/USAR Regulation 350-2, Reserve Component Training

The observer-controller/trainer (OC/T) noncommissioned officers (NCOs) are the backbone of the U.S. Army's Active Component (AC)/Reserve Component (RC) program. Responsible for the training, mobilization, and deployment of RC units, these NCOs are the silent heroes who ensure that nothing but highly trained soldiers augment and replace AC units on the frontline. The combat readiness and successful performance of RC units on the battlefield directly reflect the OC/T's enormous impact on their readiness. The OC/T's firsthand involvement in RC training directly supports the FORSCOM mission and has enhanced the Army's capability to fight and defeat the enemy around the world.

An OC/T, by definition, is a soldier tasked to provide administrative control, evaluate task performance, and give constructive feedback to participants during a training exercise. In reality, NCOs serving as OC/Ts are responsible for far more than teaching, coaching, and mentoring RC soldiers. Tasked with training, mobilizing, and deploying units to augment the U.S. Army on the battlefield, the OC/T NCOs are at the heart of the AC/RC program.

The vast majority of the AC forces are deployed around the globe in support of combat, peacekeeping, and humanitarian missions. RC forces play a critical role in homeland security and support military operations overseas. Federalized RC units support and replace AC elements on the ground with their equipment, technical/tactical competence, and motivated soldiers eager to execute their missions. These RC units are a combat multiplier to the AC and a critical asset to the U.S. Army.

In 1992, after the first Gulf War, Congress mandated a FORSCOM training program requiring that AC OC/Ts be



An AC NCO conducts an after-action review with Charlie Company, 682d Engineer Battalion.



An OC/T evaluates a Minnesota Army National Guard soldier during engineer qualification tables before deployment to Kosovo.

assigned to the training support brigades (TSBs) to monitor and train RC units and ensure their combat readiness. The OC/T's ultimate goal in this arduous backstage work is the TSB commander's certification of the unit as combat-ready and the certainty that the trained unit will magnify combat power on the front line.

The OC/Ts are the strongest link between the AC and RC, so only the best candidates are chosen for this duty. The NCOs serving in these positions are considered the most proficient and qualified soldiers within their duty military occupational specialty (MOS). The NCOs should be branch-certified with modified table of organization and equipment (MTOE) leadership for 18-24 months to be selected. Sergeants first class who have successfully served in MTOE units as platoon sergeants, operations sergeants, and in many cases as first sergeants, are the NCOs typically assigned to this 3-year duty. These NCOs possess a wealth of knowledge and experience and quickly become an invaluable asset to the RC units they support. Doctrinally sound, proven leaders and professional soldiers, OC/Ts are the most effective tools to sustain and maintain the combat readiness of RC units.

Once selected, OC/Ts undergo a series of certifications before conducting hands-on instruction with RC units. The TSBs also follow a training plan to maintain their OC/Ts' proficiency at training, coaching, and mentoring soldiers. Annual training requirements ensure that the OC/Ts are experts on the latest doctrinal developments and the most modern equipment. Aside from the primary responsibility with the RC, OC/Ts are routinely tasked to augment the combat training centers and conduct training/certification exercises for AC units on MOS-specific training. Their expertise, experience, and professionalism make these NCOs the most efficient and versatile training tool FORSCOM has to accomplish its RC mission. In contrast with combat training center observer-controllers (OCs), OC/Ts in TSBs provide continuous coverage for their assigned units. They are involved in each step, from the home-station planning and preparation phases to the execution and after-action reviews after the training event, as well as the planning and execution of follow-on training indicated by shortfalls in the initial training event.

This habitual relationship with specific RC units is imperative, ensuring maximum training effectiveness during the inactive duty training (IDT) conducted one weekend a month. The RC units have limited training opportunities to attain their expected proficiency level, so the unit assistors and the OC/Ts must orchestrate training events to ensure that they are effective and meet the unit's training needs during the 2- or 3-day IDT period. The average unit only has 39 days a year to train and prepare for its wartime mission. Nevertheless, the soldiers of these units are expected to perform and accomplish their mission whenever called into action. RC units understand their responsibility on the battlefield and recognize the importance of maintaining their personnel and equipment readiness at all times, so they count on their assigned OC/T for training support and oversight. Every training opportunity must meet the time restriction and the commander's intent and provide the desired training effect and valuable feedback to the unit.

Dedicated NCOs serving as OC/Ts often go above and beyond requirements when conducting hands-on training. They are the primary trainers and subject matter experts on tactics and the employment of military equipment. Sergeants first class who would traditionally train platoon-sized elements, train companies and their staffs. OC/Ts are typically responsible for three to five RC companies. Their scope of responsibility includes, but is not limited to, oversight on—

- Training.
- Mobilization.

Integrating Mechanized and Combat Heavy Engineer Capabilities

By Captain James Beaulieu



The lines between mechanized and combat heavy engineer capabilities blurred during Operation Iraqi Freedom. Throughout the planning stages and the conflict, Army engineers played an important role in the success of the mission. Augmenting mechanized engineers with combat heavy capabilities during the operation assured the mobility of the 3d Infantry Division (3ID) in its movement to Baghdad.

During postconflict operations, mechanized and combat heavy engineers were instrumental in maintaining the peace while performing key life-support missions. Mechanized and combat heavy engineer leaders proved that different capabilities work best when they augment each other. The result is maximum success in accomplishing any mission.

In preparing for Operation Iraqi Freedom, Bravo Company, 94th Engineer Battalion (Combat) (Heavy), detached from its parent unit and fell under the operational control of the 317th Engineer Battalion (Mechanized) to augment the engineer mission of 3d Brigade Combat Team (3BCT), 3ID. The company colocated in a 317th assembly area and integrated into that unit's operational tempo. For 15 days before the start of hostilities, Bravo Company planned, trained, prepared, and task-organized with the 317th, attaching teams to mechanized companies to augment their mobility missions. The primary mission for the combat heavy engineers in the movement north was to provide assured mobility to 3ID with the capabilities supplied by construction engineer equipment. The mechanized engineers supported Bravo Company with security and logistics while moving across the battlefield.

Bravo Company had three primary missions while under operational control of the 317th in the attack north: airfield damage repair, bridge embankment preparation over the Euphrates River, and survivability position construction. In each case, the mechanized engineers of the 317th secured the designated area of operation and access routes while the combat heavy engineers of Bravo Company followed closely behind, executing the construction mission once on-site.

Integrating the construction capability of a combat heavy company into the mission of a mechanized engineer battalion to provide mobility to a brigade combat team proved to be a success. The combat heavy capability opened options to the mechanized battalion by providing contingency mobility in the event of greater resistance from Iraqi forces. Even though resistance during the initial phases of conflict was minimal, contingency plans were in place to use combat heavy equipment if necessary to ensure the unimpeded movement of 3BCT.

Versatility is key when discussing engineer capabilities. Although there are many facets of the Engineer Regiment, all engineer units are expected to be able to execute all engineer missions. This can be difficult. The structure of the Regiment is such that mechanized engineers rarely perform construction missions, while construction engineers seldom perform mobility and countermobility missions. Working together made each unit stronger in supporting overall mission accomplishment.

Even though capabilities play a large role in the versatility of an engineer unit, the versatility of leaders at all levels can be even more critical. Leaders must understand the mechanized



Elements of Bravo Company, 94th Engineer Battalion, line up with the 317th Engineer Battalion and other units for an attack.

and combat heavy capabilities to be successful throughout all phases of conflict. This can be witnessed in Bravo Company and the 94th Engineer Battalion, where the company commander, operations officer, battalion executive officer, and battalion commander all had mechanized engineer backgrounds. The ability to understand the mechanized engineer mission and how to implement combat heavy capabilities is one that all engineer leaders should possess, but it only comes with experience and training. Rarely do junior officers leading a combat heavy platoon perform or understand the missions executed by a mechanized platoon leader. It is also rare for a mechanized platoon leader to understand the capabilities of a combat heavy platoon. This familiarity only comes with time, as officers gain rank and variety in assignments. It is the leaders who know how to execute both types of engineering who are truly valuable and can accomplish every mission.

Whether mechanized and combat heavy engineer units one day become integrated or remain permanently separated is a question asked throughout the engineer community. It appears that both units can greatly benefit from each other, providing a broad capability that could not be used when the units are separated. Time and again, when there is an important mission involving engineers, the executing unit is not solely mechanized or heavy, but a mixture of both. It seems that in any successful mission, engineers of all types have collaborated. This trend will only increase as more people realize the value of engineers' versatility.

Captain Beaulieu is attending the Engineer Captain's Career Course at Fort Leonard Wood, Missouri. Previous assignments include executive officer of Bravo Company, 94th Engineer Battalion; construction platoon leader with Alpha Company, 94th Engineer Battalion; and asphalt platoon leader with Headquarters and Support Company, 94th Engineer Battalion. He holds a bachelor's from the University of Massachusetts and is pursuing a master's in engineering management from the University of Missouri-Rolla.

("NCOs Train the Force," continued from page 23)

- Certification and qualification on weapons systems.
- Overall equipment readiness.

OC/Ts also help senior leadership face challenges and solve problems that might interfere with mission accomplishment.

The OC/Ts assigned to 1st Battalion (Training Support) (Engineer), 345th Regiment (1/345th), at Fort Jackson, South Carolina, are responsible for twelve RC engineer battalions and detachments in the southeastern United States. As part of the 5th Brigade, 87th Division (Training Support), these NCOs are fully engaged in the training, mobilization, deployment, and redeployment of units supporting operations around the globe. The 1/345th has had a direct impact on operations such as Iraqi Freedom and Enduring Freedom and the Kosovo Force (KFOR) peacekeeping mission. These engineer units range from combat mechanized and corps wheeled engineer battalions to firefighting detachments. The OC/Ts face a challenge as each of the supported units has different training needs and missions on the battlefields around the world.

NCOs serving as OC/Ts are subject matter experts in their MOSs, top-notch trainers, and role models to the RC units they support. Instructors at the Observer-Controller Academy at the National Training Center, Fort Irwin, California, state that OCs must—

- **BE**—professional, technically and tactically proficient, and the example.
- **KNOW**—the unit, the rules of engagement (ROE), and the standards.
- **DO**—provide observations, show cause and effect, and facilitate learning through the after-action review process by providing purpose and direction.

The OC/T NCOs are the backbone of the U.S. Army's AC/RC program. The combat readiness and successful performance of RC units on the battlefield directly reflect the OC/T's enormous impact on their training. The OC/T's firsthand involvement in RC training directly supports the FORSCOM mission and has enhanced the Army's capability to fight and defeat the enemy around the world.

Endnote

FORSCOM/ARNG/USAR Regulation 350-2, *Reserve Component Training*, 27 October, 1999, Chapter 1, Reserve Component (RC) Training Mission, Paragraph 1-1, page 3.

Captain Baez is an OC/T team chief with the 1/345th Regiment (Training Support) (Engineer). His previous assignments include the 536th Engineer Battalion (Combat) (Heavy) in the Republic of Panama, 8th Army in the Republic of Korea, 84th Engineer Battalion (Combat) (Heavy) in Hawaii, and Fort Jackson, South Carolina. He holds a bachelor's in industrial management from the University of Puerto Rico and is a graduate of the Engineer Officer Advanced Course.



The Tikrit River Bridge

By First Sergeant Gary Fioretti

The Tikrit River Bridge project began on 13 October 2003. Another bridge across the Tigris River was needed to facilitate civilian traffic flow while the main bridge in Tikrit closed for reconstruction. Several engineer specialties worked closely on the project, each being responsible for a different role to complete the mission.

The task organization for the mission was made up of a platoon of combat engineers, a combat support equipment (CSE) platoon, and a bridge platoon. Bravo Company, 5th Engineer Battalion, would provide security and work with the CSE platoon, from the 229th Engineer Company (CSE), to emplace force protection measures. The CSE platoon was to construct a 150-meter causeway with erosion control measures and assist with force protection. Bridge crewmen from the 74th Multirole Bridge Company would erect and launch a 350-meter double-single Mabey-Johnson float bridge.



Soldiers from the 74th Multirole Bridge Company use a crane from the 14th Engineer Battalion to install bays at the Mabey-Johnson bridge.



Hesco bastions topped with sandbags form a bunker and guard tower.

Force protection and security were the priorities for the sappers and the CSE platoon. The sappers hit the ground first from an assault float raft and immediately began to sweep, clear, and secure the land. Once security was established, the CSE platoon—with Class IV supplies—went to work immediately. The two elements worked together to emplace triple-standard concertina wire around the jobsite perimeter. The CSE platoon built earth berms around the area, as well as several equipment parks inside the perimeter, to protect equipment and personnel from small arms fire. Raised M-113 armored personnel carrier fighting positions, protected by berms around both sides and the front, were constructed for clear fields of fire above the earth walls. The last step of force protection for the platoon was to build mortar bunkers and Hesco® bastion guard towers.

Once force protection measures were completed, the causeway was built to facilitate the emplacement of the bridge. The causeway required more than 2,100 truckloads of fill, which was obtained within the perimeter. The fill was spread and compacted, and a 1-inch layer of soil stabilizer was emplaced and geotextile stretched from the headwall to the upstream side of the bank to control erosion. Concrete blocks were stacked atop each other with both layers folded slightly in between, and the roadway was lifted, graded, and compacted in preparation for asphalt that would be laid by Iraqi contractors. The nearshore preparation was contracted as well. The Iraqi scope of work included stripping away existing concrete from the levee wall and asphalt from the road. An excavator, loader, and compactor were used to create a slope to accommodate the end span of the bridge.

The bridge, which would accommodate traffic and remain in place for up to a year, was put together with cranes, forklifts, and excavators. Piers were built by locking together 20- and 40-foot pontoons, on top of which were welded I-beams and winch trays for anchorage.

Bays were constructed in mass quantities to expedite the overall construction. Each bay consisted of four panels, a transom, vertical and sway braces, vertical and top brace frames, steel decking, and curbing. After each span was completed, it was pushed off the rollers and onto the floating pier or pontoon and bolted into place. Then bridge erection boats pushed the spans into place and bridge crewmen pinned each span junction together.

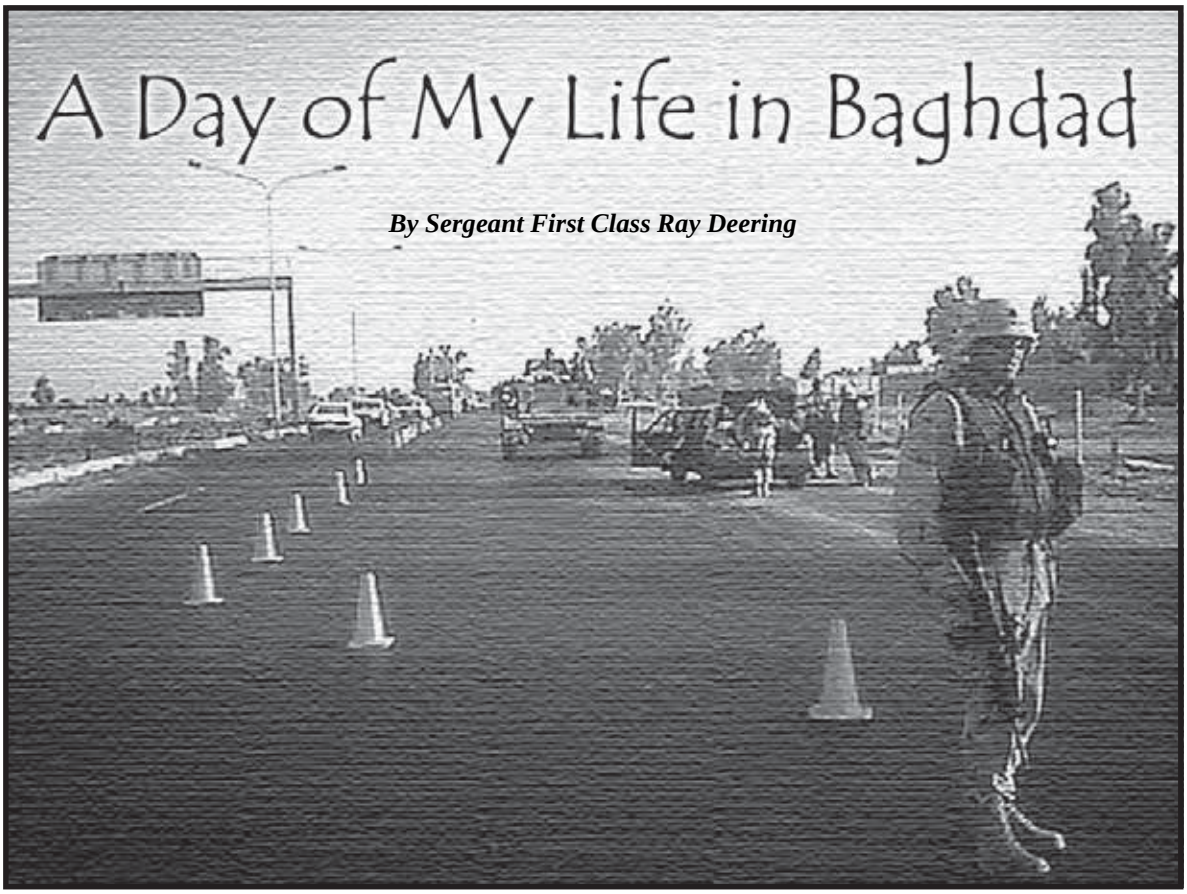
The Tikrit River Bridge was a joint effort. Iraqi contractors and locally hired civilians were an integral part of the project, with Iraqis contributing in several areas: asphalt, nearshore preparation, welding, road repair and widening, and even force protection. This project was a true representation of the U.S. Army helping Iraqis rebuild Iraq.

First Sergeant Fioretti is with Charlie Company, 14th Engineer Battalion, Fort Lewis, Washington. He is currently deployed as part of the 555th Engineer Group, 4th Infantry Division.

Photos by First Sergeant Gary Fioretti.

A Day of My Life in Baghdad

By Sergeant First Class Ray Deering



You can smell the decaying banana skins underfoot as they mingle with the fuel and exhaust fumes. Iraqi men and boys, some no more than 10 years old, shout "mister, mister, one dollar" as they shove bundles of bananas and soda cans toward you. Yet another crossing of the Al Muthana Bridge that we helped replace on the Tigris River to improve the flow of traffic into Baghdad. There must be seventy or eighty cars jockeying for a position at the front of the traffic. Normally, there would be two lanes, but somehow it has grown to four and must merge into one to cross the bridge. Horns blow and hands wave as people shout at each other, most assuredly not words of greeting or well wishes.

Another patrol, searching the streets for improvised explosive devices (IEDs), comes to a close. But first we have to make it back to our base camp, and lately the last mile has become even more dangerous, once with an attack on one of our own—our commander. As we make the last turn onto our island sanctuary, we all lighten the mood with sarcastic comments, and the same one or two guys provide our comic relief.

We clear our weapons and head back to our rooms, where we download our equipment and grab a cold bottle of water. Junior leaders verify that all equipment is serviceable and stored neatly, while we think about the time our next mission begins and what we will do to relax for an hour before we go back to work. The married guys head for the cyber café, hoping for an e-mail from their loved ones or, more importantly, that they will catch that loved one online in a chat room. Some make their way to the telephones to call home. Even more seek some solitude while they become consumed with PlayStation or GameBoy. This is their break from the reality of being away from the family, friends, comforts, and freedoms that they have all sacrificed to help bring freedom to the Iraqi people.



Soldiers guard a power plant in northern Baghdad.

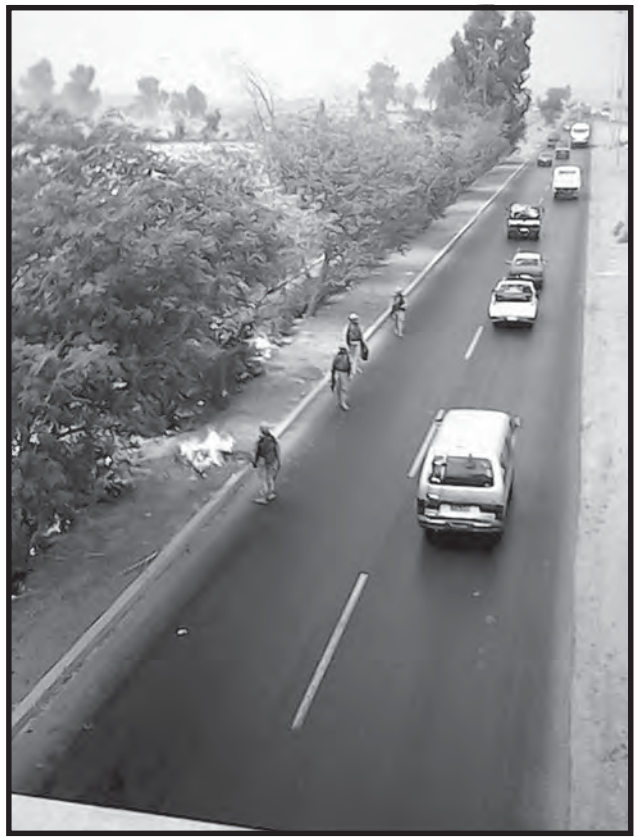
I head to the operations center to check in with the commander and first sergeant. They didn't go along on this patrol, but they are just making their way through the doors as they return from checking on a school. We discuss the heat and how it's nice that the intense climate we suffered through during the past few months has passed. There is a lighthearted atmosphere as everyone is silently thankful that we have gone out into the sector and safely returned one more time. We discuss future missions, plan the rest of the day, and bring up the truly important question: What time is mail being picked up?

There is a bond here that no one can ever explain and that is never talked about. It overcomes the differences between rank, background, experience, and personal opinion of one another's personality. It is the appreciation for the guy beside you and what he contributes and brings to the table during this time of hardship—our generation's War on Terrorism. We complain about who may or may not be doing what, whose turn it is to perform a mission or task, why more effort has apparently been put into a plan for sporting activities than was put into the plan for an upcoming mission involving multiple units. But it is done in our own group—our leadership team.

When we are together as this leadership team, we feel that we can handle any problem that comes our way, because we are in harmony when it comes to the mission. Yet we agree to disagree among ourselves, debate issues back and forth, and jibe and harass one another constantly. It is our way of relieving the pressure of the situation, to ensure that we stay focused in front of our men. It is our way of getting our secret fears out into the open, but without losing face or displaying weakness. We use each other for that, so we can lead our men with the effort and professionalism they deserve.

I wonder if the soldiers know we do it, but does it really matter if they know that or not? They look at us as we step in front of them and present a plan for a mission as if this is going to be the one mission that will break the back of the resistance in Iraq and lead the way to our returning home. We have to try to convince them that it is the best plan that has ever been conjured up in a military mind, though we constantly search our own minds and our past experiences for the things we may have forgotten, the things we have to inject to ensure that our soldiers stay motivated, stay professional, and stay alive. None of us can afford to miss doing something that we should have known to do. These men deserve our best, and so do their loved ones.

So we finish our discussions, throw away our empty water bottles, and head back to our small units, our platoons, and our men. We put that brave face back on, because for their sake we can't afford to have a bad day. We close our minds to our families for a few more hours as we go about the business of briefing tomorrow's mission, ensuring that the guard roster is straight. We deal with the concerns that a troop might have about his wife and what she may be doing with their bank account, and we talk to the guy whose wife is due to deliver their first child next month and when he'll get to go home to see his newborn.



Soldiers clear routes to prevent IED attacks.

We ensure that our equipment is ready, our weapons are clean, and our plan is foolproof—at least in our eyes. Then we take a few minutes for ourselves, go for a run, lift a few weights, or see if we can borrow a movie that we haven't already seen half a dozen times. But we know that soon we can lie down, and with that comes our own private thoughts about our loved ones, our kids, and our parents. And we know that when the morning comes, it's one day closer to getting back to them and one more trip back across our bridge, one more whiff of those banana skins, one more cry of "mister, mister, one dollar." In the back of our minds, we realize that we have experienced the greatest honor a soldier can ever have—leading troops in combat on a day with no casualties.

Sergeant First Class Deering deployed to Baghdad, Iraq, with Bravo Company, 16th Engineer Battalion, "Ready First Combat Team," 1st Armored Division, on 9 May 2003. He led a combat engineer platoon as a platoon sergeant until 17 November 2003, when he returned to the United States after 6½ years in Europe, including a tour in Kosovo as platoon sergeant. His previous assignments include the Combat Maneuver Training Center, 5th Engineer Battalion, and 12th Engineer Battalion during Operation Desert Storm.

Regimental Awards

Each year, we recognize the best engineer company, lieutenant, noncommissioned officer, and enlisted soldier—in each of the components—for outstanding contributions and service to our Regiment and Army. Every engineer unit in the Regiment can submit the name and achievements of its best of the best to compete in these distinguished award competitions. Only the finest engineer companies and soldiers are selected as recipients of these awards. The soldiers will carry throughout their careers the distinction and recognition of being the Engineer Branch's best and brightest soldiers and leaders. Following are the results of the 2003 selection boards for the Itschner and Outstanding Engineer Platoon Leader (Grizzly) Awards, the Sturgis Medal, and the Van Autreve Award:

Active Component

Itschner Award: Alpha Company, 11th Engineer Battalion (Combat), 3d Infantry Division, Fort Stewart, Georgia.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Kristin Graham, Headquarters and Headquarters Company, 14th Engineer Battalion (Corps) (Wheeled), Fort Lewis, Washington.

Sturgis Medal: Sergeant First Class Matthew Outten, Alpha Company, 54th Engineer Battalion (Corps) (Mechanized), Warner Barracks, Germany.

Van Autreve Award: Specialist Clifton Hall, Charlie Company, 864th Engineer Battalion (Corps) (Mechanized), Special Troops Battalion, Fort Richardson, Alaska.

U.S. Army Reserve

Itschner Award: Alpha Company, 244th Engineer Battalion (Combat) (Heavy), Boulder, Colorado.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant William R. Zinkgraf, Charlie Company, 489th Engineer Battalion, Harrison, Arkansas.

Sturgis Medal: Staff Sergeant David F. Schofield, Detachment 6, Alpha Company, 249th Engineer Battalion (Prime Power), Fort Lewis, Washington.

Van Autreve Award: Specialist Adam R. Simon, Bravo Company, 489th Engineer Battalion, Harrison, Arkansas.

Army National Guard

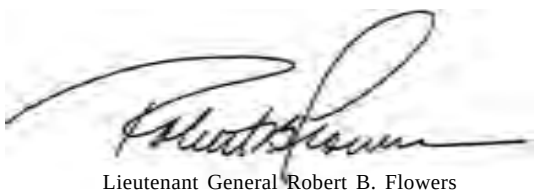
Itschner Award: Charlie Company, 1457th Engineer Battalion (Combat), Spanish Fork, Utah.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Mark L. Topp, Alpha Company, 142d Engineer Battalion (Heavy), Wahpeton, North Dakota.

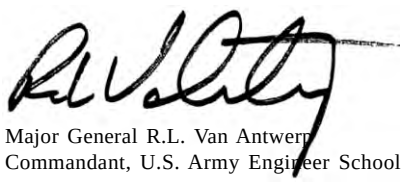
Sturgis Medal: Sergeant First Class David J. Varelas, Bravo Company, 14th Engineer Battalion (Combat), Fort Lewis, Washington.

Van Autreve Award: Specialist Kelly R. Goehring, Bravo Company, 142d Engineer Battalion (Combat) (Heavy), Wahpeton, North Dakota.

All of the nominees represented their major commands with the highest professionalism and dedication to the Engineer Corps's vision and deserve our highest praise. The award recipients were recognized at ENFORCE 2004, 26-30 April, Fort Leonard Wood, Missouri.



Lieutenant General Robert B. Flowers
Chief of Engineers



Major General R.L. Van Antwerp
Commandant, U.S. Army Engineer School

Soldier Enhancement Program

By Sergeant Major Thomas House and Mr. Larry T. Hasty

There is a process in the Army that was established to help soldiers get needed commercial items fielded in a short period of time. The Soldier Enhancement Program (SEP) was congressionally approved in 1989, initially for the "foot soldier," but revised in 1992 to include all soldiers. The objective of the SEP is to increase the lethality, survivability, mobility, command and control, and sustainability of the soldier through an accelerated acquisition process to get lighter, more lethal weapons and improved "soldier items" into the hands of soldiers quicker. SEP recommendations from soldiers and their commanders are highly encouraged. Participation by soldiers and their commands enhances the credibility of the program and ensures that SEP dollars are focused where they will do the most good.

Proposals go to the SEP Council, which convenes quarterly. To qualify for a SEP project, a proposal must be—

- An item that will be worn, carried, or consumed by individuals in a tactical environment.
- A nondevelopmental item that is now commercially available, off-the-shelf.
- An item soldiers are buying with their own money to make life better in the field.

Upon approval by the SEP Council, the proposal will be assigned to one of the U.S. Army Training and Doctrine Command (TRADOC) proponent schools to develop a tailored capability development document (CDD) for the item, and the CDD will be approved by that school's commandant to expedite the process. For some items, such as other government agency items or items in the General Services Administration catalog, a CDD may not be required.

The SEP is not an incentive awards program. No monetary awards are given for proposals that are adopted for use and that result in savings to the government.

Current programs in various stages of the SEP process include the following:

- Rapid wall-breaching kit
- XM102 reloadable hand grenade
- M9 pistol rail
- Blast-protection footwear
- Enhanced fuel bar
- Electric stun device
- Petroleum, oil, and lubricant (POL) handler gloves
- Family of metal detectors
- Semiautomatic sniper system
- Close combat mission capability kit
- Close quarters battle kit
- Modular accessory shotgun
- Family of suppressors
- Integrated laser white-light pointer
- 12-gauge extended-range nonlethal round
- XM104 nonlethal bursting hand grenade
- Fuel handler coveralls
- Future handgun system
- Military operations in urban terrain lifeline
- Maxillofacial shield

SEP proposals can be submitted through the automated process at <*http://peosoldier.army.mil*>. Proposal forms can be obtained by e-mailing Sergeant Major Thomas House or Mr. Ken Sutton at the TRADOC System Manager-Soldier office at Fort Benning, Georgia, at <*houset@benning.army.mil*> or <*suttonk @benning.army.mil*> or calling DSN 835-1189/6047/3327 or commercial (706) 545-1189/6047/3327 or mailing—

Mr. Ken Sutton
6751 Constitution Loop
Building 4, Room 632
Fort Benning, Georgia 31905

The Assistant TRADOC System Manager-Soldier at Fort Knox, Kentucky, can also provide information and SEP proposal forms. E-mail Lieutenant Colonel Craig Carson at <*craig. carson@knox.army.mil*> or Mr. Larry T. Hasty at *larry.hasty@knox.army.mil* or call DSN 464-3662/3519 or commercial (502) 624-3662/3519.

Sergeant Major House is the TRADOC Systems Manager-Soldier sergeant major, Fort Benning, Georgia.

Mr. Hasty is the deputy and senior technical advisor to the Assistant TRADOC Systems Manager-Soldier at the U.S. Army Armor Center, Fort Knox, Kentucky.

Correction

An article entitled "Wearing Synthetic Fiber Underwear Under the Nomex CVC Uniform," (*Engineer*, October-December 2003, page 37) contained National Stock Numbers (NSNs) for obsolete combat vehicle crewman gloves. The recommended replacements are "Gloves, flyers, summer (green)*," or "Gloves, mounted crewman," with the following NSNs and sizes:

Gloves, flyers, summer (green)		Gloves, mounted crewman	
8415-01-482-8417	4	8415-01-446-9247	5
8415-01-040-2012	5	8415-01-446-9248	6
8415-01-040-1453	6	8415-01-446-9252	7
8415-01-029-0109	7	8415-01-446-9253	8
8415-01-029-0111	8	8415-01-446-9254	9
8415-01-029-0112	9	8415-01-446-9255	10
8415-01-029-0113	10	8415-01-446-9259	11
8415-01-029-0116	11		
8415-01-482-8420	12		

* Other colors may be available.



Logistical Base Support for the Polish Multinational Division

By Captain Christopher S. Cooper

The chief of engineers for the Polish Multinational Division (MND) faced challenges when he and his advanced party entered the Operation Iraqi Freedom theater in late July 2003. The MND headquarters at Camp Babil, controlled by 1st Marine Division, 1st Marine Expeditionary Force, was scheduled to receive more than 12,000 soldiers from more than 16 countries in three weeks. There was not enough room for everyone at Camp Babil, next to the ancient city of Babylon, and historical covenants prevented further expansion of the base. Furthermore, the closest logistical center was more than 250 kilometers to the south in an area not even within their sector.

To alleviate their space and logistical problems, the Polish MND decided to use a 10-acre compound along the Shatt Al Hillah, a stream 7 kilometers away on the outskirts of the city of Al Hillah. The site was a former Iraqi youth training center that focused on mobile bridging operations. Unfortunately, other than the natural border of the river to the west, a wall that bordered the street to the east, and civilian residences to the south, there were no force protection measures in place. Complicating matters, 20 billets, 10 administrative buildings, and several burned-out Iraqi mobile bridging pieces stood where the planned logistical base was to go. The Polish MND needed help, so it turned to Coalition Joint Task Force-7 for engineering support.

The 265th Engineer Group, a Georgia National Guard unit currently in control of the southern Iraqi sector with four battalions, received the call. After a reconnaissance of Al Hillah, the 265th developed a joint mission with U.S. Army engineers; MND forces; Kellogg, Brown and Root, the support services contractor; and local Iraqi labor to assist the Polish division.

Kellogg, Brown and Root—with an Iraqi contractor—focused on establishing the southern gate and berm, preparing the fuel and ammunition supply points, and refurbishing the buildings. U.S. Army engineers were responsible for demolishing the former Iraqi billets and administrative buildings, then constructing a protective berm surrounded by a triple-standard concertina wire fence. For that mission, the 265th selected a company (-) consisting of an equipment support platoon and a platoon of combat engineers from the 1092d Engineer Battalion, a West Virginia National Guard unit. The Polish MND supported them with Romanian engineers and equipment, as well as Hungarian soldiers to provide security. Local Iraqi workers assisted as laborers.

The mission had three phases: reduce the 30 buildings to rubble; construct the berm; and concurrently, train and supervise the Iraqi laborers. In addition, combat engineers would sweep the area for unexploded ordnance and supplement the Hungarian security force.



Engineers use a bulldozer to push debris into a protective berm around the logistical base.



Rubble from demolition projects was reused to construct force protection berms.

The first night after the mission began, a mortar attack dropped eleven 60-millimeter shells on the site. No one was injured and no equipment was damaged, but the need for force protection became acutely obvious.

An immediate problem was the extremely high water table. Next to the river, it was as close as 6 inches to the surface, so very little fill material was available for berm construction. Leaders decided to use rubble from the building demolition and several of the destroyed mobile bridges as fill material for most of the berm.

Demolition of the buildings progressed rapidly. However, loading the rubble into dump trucks and transporting it to the berm for fill material was hard on the equipment. The Iraqi buildings were constructed with a lot of rebar that wreaked havoc on tires. In one day alone, the support platoon's vehicles had 15 punctures. Their maintenance element performed admirably, establishing a close relationship with the maintenance shop at Camp Babil for replacement parts.

The Iraqi laborers quickly learned fence installation and kept pace with the berm construction. The Polish commander inspected the work one week into the mission and said that he now felt more comfortable bringing his forces into the area. He mentioned that stories about the mortar attack had been printed in the Polish press. When reporters asked what he was doing about the situation, he responded, "The U.S. Army engineers are currently solving the force protection issue for the MND forces." After 15 days on the ground, the mission was complete.

Captain Cooper is a member of the U.S. Army Reserves. He served as a combat engineer platoon leader and as a battle captain for the 265th Engineer Group during Operation Iraqi Freedom. At the time this article was written, he was the Polish MND liaison officer. He holds bachelors' in journalism and education and a master's in education. In civilian life, he is a teacher.

The Engineer Writer's Guide

Engineer is a professional-development bulletin designed to provide a forum for exchanging information and ideas within the Army engineer community. We include articles by and about officers, enlisted soldiers, warrant officers, Department of the Army civilian employees, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to engineers. Articles may share good ideas and lessons learned or explore better ways of doing things.

Articles should be concise, straightforward, and in the active voice. If they contain attributable information or quotations not referenced in the text, provide appropriate endnotes. Text length should not exceed 2,000 words (about eight double-spaced pages). Shorter after-action-type articles and reviews of books on engineer topics are also welcome.

Include photos (with captions) and/or line diagrams that illustrate information in the article. Please do not include illustrations or photos in the text; instead, send each of them as a separate file. Do not embed photos in PowerPoint®. If illustrations are in PowerPoint, avoid excessive use of color and shading. Save digital images at a resolution no lower than 200 dpi. Images copied from a Web site must be accompanied by copyright permission.

Provide a short paragraph that summarizes the content of the article. Also include a short biography, including your full name, rank, current unit, and job title; a list of your past assignments, experience, and education; your mailing address; and a fax number and commercial daytime telephone number.

Include a statement with your article from your local security office that the information contained in the article is unclassified, nonsensitive, and releasable to the public. Not only is *Engineer* distributed to military units worldwide, it is also available for sale by the Government Printing Office.

We cannot guarantee that we will publish all submitted articles. They are accepted for publication only after thorough review. If we plan to use your article in an upcoming issue, we will notify you. Therefore it is important to keep us informed of changes in your e-mail address or telephone number. All articles accepted for publication are subject to grammatical and structural changes as well as editing for style.

Send submissions by e-mail to <*engineer@wood.army.mil*> or send a 3 1/2-inch disk in Microsoft Word, along with a double-spaced copy of the manuscript, to: Editor, *Engineer Professional Bulletin*, 320 MANSCEN Loop, Suite 210, Fort Leonard Wood, Missouri 65473-8929.

Note: Please indicate if your manuscript is being considered for publication elsewhere. Due to the limited space per issue, we do not print articles that have been accepted for publication by other Army professional bulletins.



National Training Center (NTC)

Force-on-Force Convoy STX Lane

By Captain Christopher Kuhn

During a recent rotation at NTC, the Sidewinder team organized and conducted several situational training exercise (STX) lanes. One of those included a convoy lane that trained units on the dangers currently encountered on a daily basis by convoys deployed for Operations Enduring Freedom and Iraqi Freedom. These notes address the setup of the lane so that units can train this critical task at home station.

Plan the Training

The first step is planning the training and allocating a suitable training area to conduct the training. The convoy route should be long enough to allow each event on the lane to occur independently of each other, as well as allow for retraining on certain events. The lane is designed for a company-sized element and consists of a unit receiving a fragmentary order (FRAGO) to conduct a mounted tactical road march along a specified route. The convoy commander will conduct troop-leading procedures (TLP), issue a movement order, and command and control the convoy along the designated route. The convoy will encounter various contacts along the route, to include a civil disturbance, a rocket-propelled grenade (RPG) attack, an improvised explosive device (IED), and a near ambush. For the STX lane, the Opposing Force (OPFOR) and observer-controllers (OCs) must be identified. The following resources are required:

- OPFOR truck: 1
- Simulated RPGs: 2
- Civilian vehicles: 3
- Injured civilian on the battlefield (COB) moulage kits: 3
- Simulated man (SimMan): 1
- IED (inert): 1
- Daisy-chained IED: 1
- COBs (wedding party): 14
- Paramilitary (RPG ambush): 3
- Explosive ordnance disposal (EOD) personnel: 2
- Detainee (anti-U.S.) COBs: 3
- Suspect (possibly anti-U.S.) COBs: 3
- Paramilitary snipers: 2
- OCs: 4
- Route: Approximately 30 kilometers

Train and Certify Leaders

The training objectives for the lane for the OCs, OPFOR, and unit leaders should be to—

- Prepare for combat.
- Conduct a tactical road march.
- React to a civil disturbance.
- React to actions on contact.
- Treat and evacuate casualties.
- Call for medical evacuation.
- Perform recovery operations.
- Conduct consolidation and reorganization.

Recon the Site

The OCs and OPFOR should conduct a joint reconnaissance of the route to determine the locations of the events, rehearsal areas, and after-action review (AAR) location.

Issue the Plan

The unit should receive the FRAGO at least one day before the scheduled lane execution. This will allow the convoy commander and the unit to conduct their TLP, precombat checks (PCCs), precombat inspections (PCIs), and rehearsals.

Rehearse the Lane

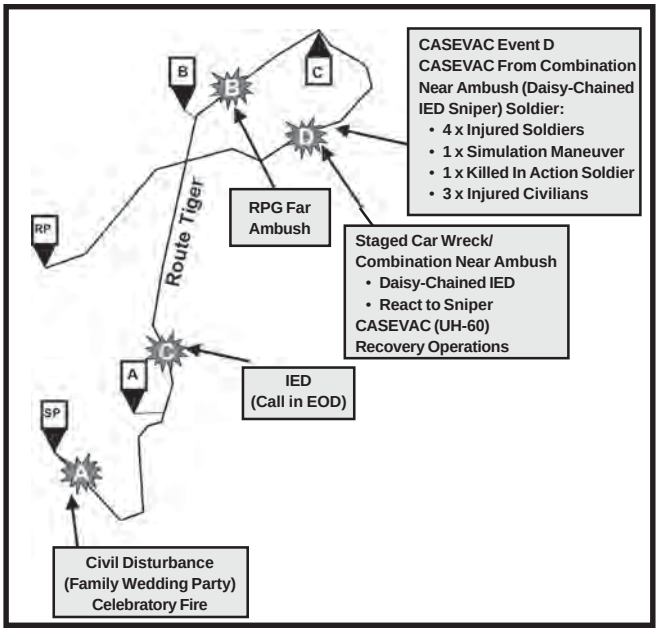
It is important for the OCs and OPFOR to conduct a rehearsal of the execution of the lane. Each event on the route should be rehearsed, to include movement to the training area, emplacement of OPFOR forces and IEDs, contact with the training unit, and criteria for disengagement. Unit rehearsals could focus on reactions to contact, casualty evacuation (CASEVAC), and movement techniques.

Execute the Lane

The lane begins when the convoy commander receives the FRAGO. The unit then begins TLP, rehearsals, and production of its movement order. The unit will have a set start point time, which allows the lane officer in charge (OIC) to ensure that the lane events are set up and ready for execution as the unit moves along the route. The figure on page 35 shows an example of a lane layout. Communication is critical between the event sites and the lane OIC. One OC should move with the convoy to give the event sites advanced notice that the convoy is approaching.

For this particular lane, the Sidewinder team emplaced four events for the convoy:

- A civil disturbance, consisting of a family wedding party shooting celebratory fire in the air.
- An inert IED placed along the convoy route.



Convoy Lane Organization

- An RPG ambush.
- A staged car wreck, consisting of a daisy-chained IED and sniper ambush.

Based on unit reactions, OCs assessed the number and type of casualties. If aircraft were available, the unit requested air CASEVAC for the wounded. If none were available, the unit conducted nonstandard CASEVAC. Additionally, the Sidewinder team used a SimMan, a 190-pound mannequin—connected to a laptop computer—that can simulate the actions of a live human being with any type of injury. It is a great tool for providing immediate feedback to a medic or combat lifesaver.

Conduct an AAR

OCs conducted the AAR at the release point of the route. An AAR could also be conducted after each event if the unit did not achieve the desired objective.

Retrain

Any event could be reset at another location along the route if the unit failed to react properly during any of the events. To do this, the route must allow enough time for the event to be repositioned without impacting the unit's movement. Additionally, the unit can stop, conduct an AAR, and retrain a particular event before continuing along the route.

Summary

The lane allowed the convoys to train on different forms of contact, as well as land navigation, CASEVAC, recovery operations, and consolidation and reorganization activities. This ensured that the units were adequately trained before executing the convoy live-fire exercise that is also available at NTC.

POC is CPT Christopher Kuhn (SW12), (760) 380-7051 or DSN 470-7051, e-mail <*sw12@irwin.army.mil*>.

Convoy Live-Fire Exercise

By Captain Timothy R. Vail

During Vietnam, combat service (CS) and combat service support (CSS) units established "gun trucks" to protect the vital shipment of supplies from Vietcong ambushes along Highway 19, the only major hard-surfaced highway that led from Qui Nhon to An Khe. Rather than equip and train CS/CSS units with dedicated firepower to ensure self-sufficient security for the moving pieces of our pre-Operations Enduring Freedom and Iraqi Freedom CS/CSS force structure, the Army anticipated and trained for a linear battlefield where CS/CSS units would be secure from high-intensity threats based on their location on the battlefield.

The 507th Maintenance Company served as a report card for the Army in the well-published accounts of the events that led to the paramilitary ambush of the unit near the eastern part of Nasiriyah, Iraq, on 23 March 2003. The paramilitary ambush resulted in the deaths of eleven U.S. soldiers and the apprehension of an additional seven soldiers.

Establish a Training Strategy

In response, NTC has established a training strategy for CS/CSS to train units to account for the 360-degree threat that makes up the contemporary operating environments (COEs) of Operations Enduring Freedom and Iraqi Freedom. Figure 1 shows the full spectrum of the COE at NTC. The capstone event of this strategy during an NTC rotation is the convoy live-fire exercise.

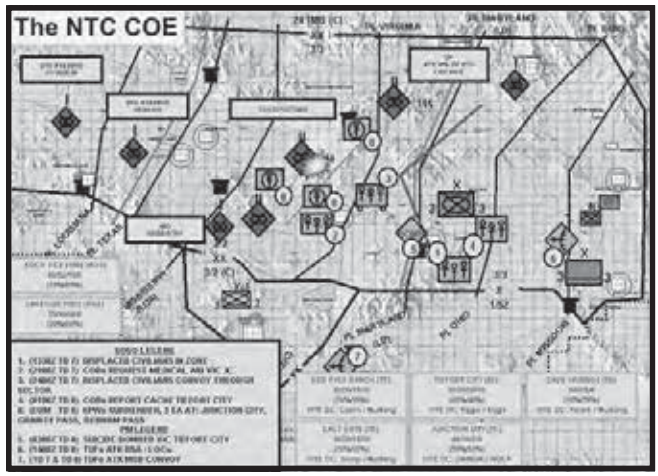


Figure 1. NTC Full-Spectrum COE

CSS units are required to analyze intelligence reports and the military aspects of terrain and conduct direct-fire planning and rehearsals for actions on contact as critical components of the troop-leading procedures (TLP) for convoys. As units execute their convoy operations, they must react to paramilitary threats that include improvised explosive devices (IEDs) and rocket-propelled grenades (RPGs) through effective direct-fire control. Additionally, units execute casualty evacuation (CASEVAC) and control as part of their actions on contact.

This live-fire scenario gives individual soldiers greater confidence in their weapons proficiency, small-unit leaders confidence in their control of direct and indirect fires, and platoon leaders confidence in conducting the critical aspects of the TLP that are required for CS/CSS units to maneuver throughout the COE. Recommended training objectives for convoy commanders and vehicle commanders, as well as home station training strategies to prepare units for a convoy live-fire exercise, are as follows:

Convoy Commanders

- Take advantage of terrain analysis route planning tools to identify terrain-based fire control measures and areas vulnerable to IED/RPG ambushes.
- Organize unit formations and vehicle orders of march to mass fires upon contact and employ the best weapons for the target.
- Ensure that well-established battle drills exist for—
  - √ Actions on contact (all eight forms).
  - √ En route vehicle jump plans.
  - √ Vehicle self-recovery plans (allocation and distribution of tow bars).
  - √ Casualty treatment and collection.
  - √ Calls for fire.
- Include terrain- and enemy-based fire control measures in the movement plan.
- Establish and rehearse a direct-fire plan:
  - √ Establish and disseminate direct-fire control measures to all soldiers (enemy locations, target reference points, fire patterns).
  - √ Assign sectors of fire integrated with unit formations and weapons systems location.
  - √ Disseminate well-established weapons control status and weapons safety posture.
- Integrate and rehearse indirect-fire support.

Vehicle Commanders

- Ensure that all weapons systems are assigned sectors of fire with clearly defined engagement criteria.
- Develop cross-leveling and reloading procedures for each weapon system.
- Issue vehicle orders, ensuring that threat, route, fire control measures, and contingencies are briefed to the crew and passengers.
- Actively control fires from their vehicle platforms.
- Know the surface danger zones (SDZs) for each weapon system on the vehicle and the sectors of fire for the other vehicles in the convoy to prevent fratricide. Figure 2 is an example of the NTC convoy live-fire SDZ.

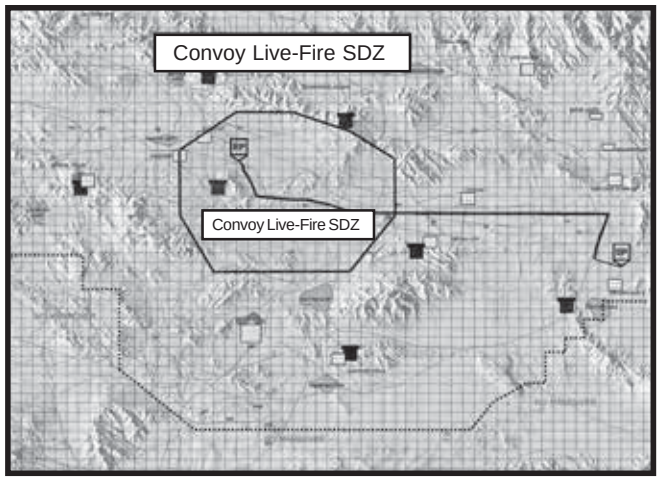


Figure 2. NTC Convoy Live-Fire SDZ

Home Station Training Strategy

- Units can train convoy operations in preparation for NTC and Operations Enduring Freedom and Iraqi Freedom at their home stations.
- Installations that have the Engagement Skills Trainer 2000 can support CS/CSS units with collective fire direction and control tasks.
- Units can request short-range training ammunition and bolt adapters from their ammunition managers in order to fire the ammunition that will reduce SDZs of weapons systems to use multiuse ranges and develop their own convoy live-fire gunnery exercises.
- Units can conduct leader training on TerraBase/MicroDEM route analysis tools that will train leaders on identifying potential target reference points and ambush locations.

Conduct the Exercise

Following are some prerequisites for conducting a convoy live-fire exercise at NTC, as well as some suggested events to enhance training at NTC and the home station.

- Ensure that all firers participating in convoy live-fire events are qualified on their assigned weapon and have conducted stationary familiarization fires from their vehicles.
- Use limiting stakes for troops firing from passenger areas of vehicles.
- Use sandbags to enhance troop areas to increase stability of individual weapon systems.
- Ensure that each vehicle has a safety who can maintain visibility on all weapons.
- Ensure that vehicle safeties can maintain constant communication and monitor and supervise the execution of the proper weapons safety postures and direct-fire engagements.
- Conduct blank-fire dry runs before executing the live fire.

- Consider adding simulated IEDs, vehicular mobility kills, and CASEVACs to advanced convoy live-fire exercises.
- Allot time for vehicle safeties to conduct after-action reviews (AARs), as well as comprehensive AARs for the convoy as a whole.
- Use a video as much as possible to evaluate fire commands, engagement techniques, fire distribution, and command and control.

Figure 3 shows the target layout for a convoy live-fire exercise.

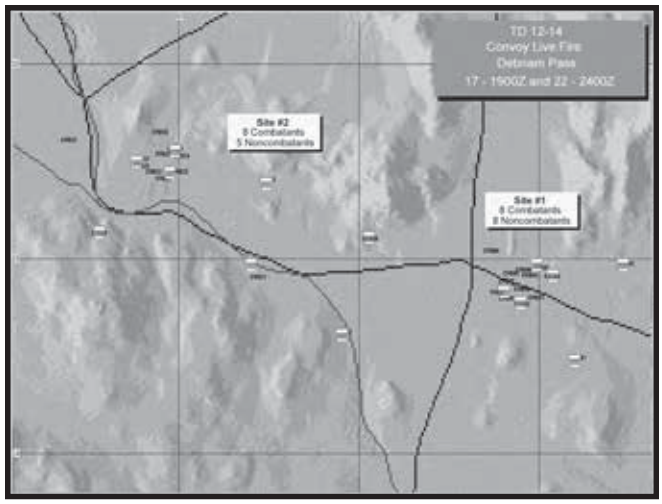


Figure 3. NTC Convoy Live-Fire Target Layout

Summary

Due to the ever-changing COE and the dangers currently faced during Operations Enduring Freedom and Iraqi Freedom for even the simplest convoys, units must train on all aspects of convoy operations. NTC provides that training in a live-fire scenario for all CS/CSS units. Units will be prepared for the most dangerous situations by training in realistic conditions at home station as well as at NTC.

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Geospatial Teams

By Sergeant First Class Gregory T. Alston

NTC is undergoing a tremendous change that makes up the contemporary operating environment (COE). New urban areas have been built to address and identify the challenge that today's soldier might encounter in deployments for Operations Enduring Freedom and Iraqi Freedom. In the past, units have looked at urban areas as obstacles and have chosen to bypass them. However, this paradigm no longer applies.

During stability operations and support operations (SOSO), units must enter towns to conduct cordon-and-search or attack missions, establish checkpoints within population centers, or conduct raids on possible paramilitary camps in and around towns. Commanders require that terrain experts (geospatial analysts) conduct thorough analyses of the terrain surrounding population centers as well as analyze the urban terrain enabling commanders to "see the terrain."

In October 2003, the first military occupational speciality (MOS) 21U40 geospatial analyst (formerly MOS 81T topographic analyst and MOS 81Q terrain analyst) team trainer arrived at NTC. This is the first time in the history of NTC that a geospatial analyst observer-controller has been on permanent staff in the Operations Group.

Geospatial Team Trends

Most brigades or units of action (UA) deploy to NTC with a four-soldier geospatial team. Based on observations over the past six months, there are trends that units with these teams must address in order to better take advantage of this capability:

Trend No. 1: Modified combined obstacle overlays (MCOOs) are inadequate.

Recommendation: Use the Digital Topographic Support System (DTSS) to build and update the MCOO and use in predeployment training at the home station. Subordinate units must then provide feedback (bottom-up refinement) to geospatial teams based on observations "on the ground" so that the MCOO is continually updated and more accurate for the planning of future operations. Figure 1 is a sample of a MCOO developed on a DTSS by a rotational unit.

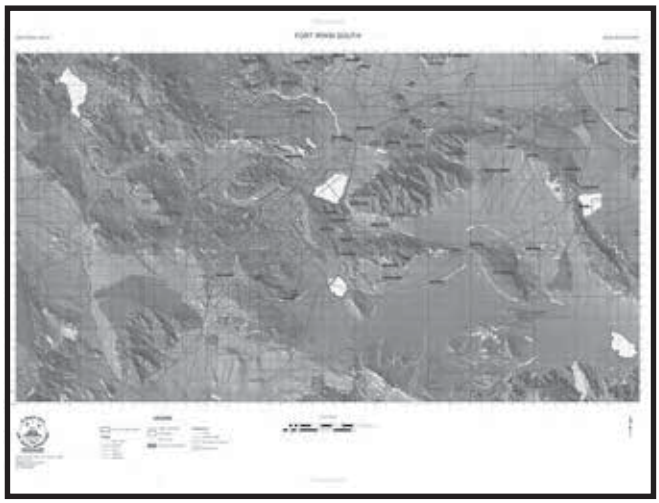


Figure 1. Modified Combined Obstacle Overlay

Trend No. 2: Brigade combat team (BCT) and UA staffs lack an understanding of geospatial team capabilities.

Recommendation: Incorporate geospatial teams into BCT/UA training as soon as possible at home station before deployment. This will allow the team to participate in as many planning processes as possible, enabling the staffs to recognize their capabilities and integrate them more fully. Figure 2 is an example of the geospatial team capabilities.

Planning

- Integration into intelligence preparation of the battlefield (IPB) – MCOO, line-of-sight/perspective views from templated enemy locations, route visibility plots to identify key terrain, and written analysis of the area of operation.
- Course of action (COA) development – Identification of COAs based on effects of weather and terrain; improvement of COA sketches to enable the commander to visualize the terrain.
- COA analysis – Support to wargaming through refined products from mission analysis; enemy line-of-sight/weapons range analysis from templated enemy locations; line of sight for BCT/UA collection assets, line-of-sight/weapons range analysis for friendly weapons systems.

Preparation

- Continued refinement of products – made available to subordinate units for their planning processes.
- Rehearsals – geospatial products such as blowups for terrain model/sketch map rehearsals.

Execution

- Imagery maps – for all subordinate commanders to fight from for their respective areas of operation, allowing them to "see the terrain."
- "On-the-spot" geospatial analysis – for the battle staff in the BCT/UA command post, allowing them to make recommendations to the commander on the ground.

Figure 2. Capabilities of Geospatial Analysis Teams

Trend No. 3: BCTs and UAs have no standard operating procedures (SOPs) for "by-mission-type" terrain products.

Recommendation: Develop SOPs so that geospatial teams know exactly what products they must produce for certain mission types. Figure 3 provides a list of terrain products for the SOSO missions alluded to earlier in these notes.

Raid on Paramilitary Camps

- Overhead imagery to identify infiltration routes into the camps (see Figure 4).
- Perspective views of the proposed routes.
- Line-of-sight analysis from the enemy and friendly force locations.
- Line-of-sight analysis for Long Range Advanced Scout Surveillance System (LRAS3).

Cordon and Search/Knock/Attack

- Overhead imagery to identify routes into towns/cities.
- Perspective views of critical terrain surrounding towns/cities.
- Town layout and identification of key buildings (see Figure 5).

MSR Reconnaissance and Clearance

- MCOO (see Figure 1, page 37).
- Overhead imagery to clearly identify all routes connected to main supply routes (MSRs).
- Route visibility plots focusing on defile areas along the MSRs (see Figure 6).
- Gap-crossing products.

Miscellaneous

- Subterranean infrastructure (caves and tunnels).
- Water and electrical lines.

Figure 3. Geospatial Team SOP for SOSO Missions

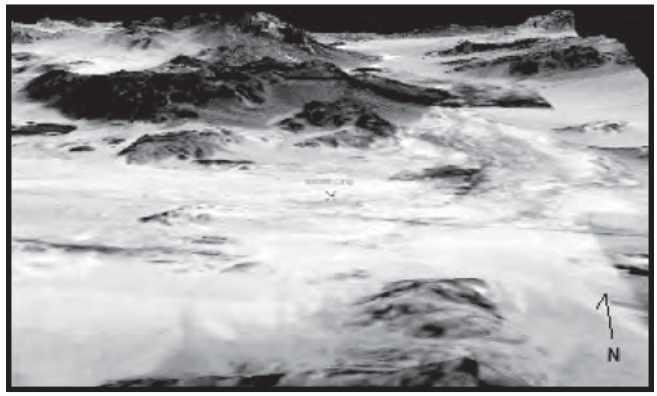


Figure 4. Perspective View of Terrain Surrounding Paramilitary Camp



Figure 5. Overhead Imagery of Urban Terrain Displaying Layout of Infrastructure

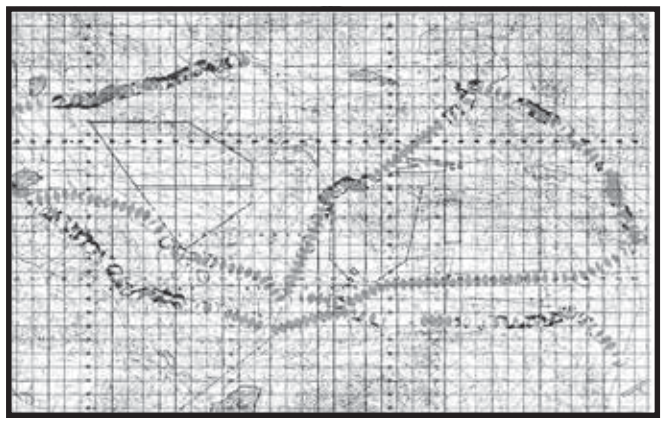


Figure 6. Route/Visibility Plot Along MSRs

Summary

With the ever-changing COE, it is more critical now than ever that geospatial teams are trained and capable of enabling commanders and staffs to see the terrain. Through proper training on the DTSS, integration with brigade and UA staffs, and development of SOPs, geospatial teams can provide relevant input into SOSO or combat operations.

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THE MARAUDERS:

A SMALL-SCALE JOINT AND MULTINATIONAL OPERATION

By Major Ted Read

Fort Leonard Wood, Missouri, is the home of the Army's Engineer, Military Police, and Chemical Branches, and it is also home to a championship rugby side (team). The Fort Leonard Wood Rugby Football Club—the Marauders—is the 2003 Missouri Rugby Football Union Division III Champion, and on 14 -15 May, the club became the Western Region runner-up. The Marauders have earned the Missouri Rugby Football Union a No. 2 seed in next year's Western Region Division Championship Tournament.

These are outstanding accomplishments for a military side. The Marauders are one of the smallest (in weight) and most mature (in player age) clubs in Missouri and definitely the smallest and oldest club with a large portion of first-time players in the Western Region Division III Tournament. In short, the club is old and slow, but also young (inexperienced) and skinny. Despite this, it went on to win in Division III and played in one of only seven regional championship matches in the nation. The club's success comes from technique, teamwork, and a large dose of heart.

The Fort Leonard Wood international community contributes greatly to the club's success by assisting with the development of techniques, thorough up-to-date drills, and practices. There are Australian, New Zealand, British, Canadian, and American players, as well as family members and supporters of the side. The club's president is a British colonel who has played on the English National 7s. Last year's vice president was a British military police major, and the club's on-field captains in the Western Region Division championship game were a major from Australia and a warrant officer from New Zealand. In short, the club is a minicoalition that puts aside national and personal differences to share sweat, pain, and blood in the middle of Missouri.

The team is living proof that joint and allied interdependence is, in the micro, a reality. Both the American and international players, as well as the coaches, have put aside branch and service baggage to attain a higher goal. The team is truly a combined arms outfit, with engineer, military police, chemical, medical, aviation, and judge advocate (No, he is not



2003 Missouri Rugby Football Union Division III Champions

on retainer!) soldiers on the rolls. The team is also joint—with Army, Marine, and Coast Guard members. The team relies on everyone's blended backgrounds to ensure success.

Nothing in America can be done without community support. The mid-Missouri area has contributed greatly to the club in both financial and moral support. The club has sponsors and supporters from Rolla in the east, Springfield in the west, Lake Ozark in the north, and St. Robert in the south. All of the players, coaches, and family members send a heartfelt "thank you" to the community for all it does, not only for the club but for all soldiers in general.



2004 Western Region Runner-Up Team

The greatest attribute of the team is its heart and spirit. One of our members—a 60-year-old man who has battled throat cancer—puts every ounce of his energy into the time he is on the pitch (field). When he steps onto the pitch, it completely changes the complexion of the games. No pain is felt by the Fort Leonard Wood side, because he feels more pain walking up the stairs than the rest of the club does after a three-match (game) day. To commemorate this "fire," the club has created an award that bears his name—the "heart" award. You can see the award in the club's trophy case on the second floor of Lincoln Hall, at the Maneuver Support Center, Fort Leonard Wood.

The magnitude of this award can be seen in this year's recipient. Early in the season, one of the players was in a terrible automobile accident that he miraculously survived. However, he was told that he would not get out of the hospital for months and would probably never walk again. But he surprised everyone 6 weeks later when he willed himself, his body, and his walker across a quarter mile of uneven terrain to be on the sideline at an away game in St. Louis. Three months later, he walked completely unassisted to watch the club's last home match. Three weeks after that, the Army could not keep him away from his job teaching soldiers how to fight, win, and survive to fight again on the battlefield. The club's players and supporters have nothing but admiration for these two phenomenal people. They are an inspiration to all of us.

Even though the club is old, inexperienced, small, and from a patchwork of disciplines and nationalities, it has a reputation of being tough, gritty, aggressive, and team-driven. It also has a reputation of being a well-rounded side where no grudges are kept and both sides meet afterward for an outstanding meal (from one of our sponsors) and a drink or two to ensure that the brotherhood of rugby (players, supporters, and family) lives on. The key to this positive reputation in the rugby and Ozark communities is heart. Heart comes in all shapes and sizes and in all nationalities. Fort Leonard Wood has that heart, which comes from the community—civilian and military, international and American—and it has a tough and disciplined rugby club to prove it.

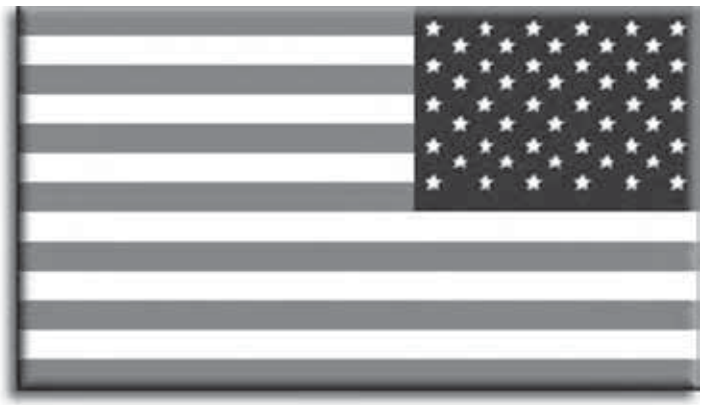


Phase Play Against a Galveston Team

Major Read is an instructor/writer in the Department of Instruction, U.S. Army Engineer School, Fort Leonard Wood, Missouri. He was previously an engineer observer/controller at the Combat Maneuver Training Center, Hohenfels, Germany, and commanded Charlie Company, 9th Engineer Battalion, 1st Infantry Division, in Schweinfurt, Germany. He has deployed to operations in Somalia, Haiti, the Balkans, and Afghanistan.

Is the Flag "Backwards" on Soldiers' Sleeves?

By Ms. Lisa Burgess



Why do American soldiers wear the U.S. flag insignia "backwards" on the right shoulder of their utility uniforms, with the canton (the rectangle with the stars) on the observer's right? It's a question that soldiers hear frequently as they travel through civilian airports or talk to members of other services. And it does look "wrong" because U.S. federal code calls for the canton always to be positioned to the left.

The soldiers aren't wrong, however, and neither are their tailors. The Army has two authorized flag patches, one to be worn on the left shoulder, with the canton facing left, and another "reverse field" patch worn on the right shoulder, with the canton facing right. The two different orientations are mandated because Army regulations call for the flag "to be worn so that to observers, it looks as if the flag is flying against a breeze."

What does a stiff wind have to do with this custom? The rule is a nod to the U.S. Army's early history, when wars were fought as a series of carefully choreographed battles, with two armies meeting on a field, clashing head-on until one side emerged victorious. In those battles, infantry and mounted cavalry units would always designate one soldier as "standard bearer" to carry the colors into the fight. As the standard bearer charged, his rapid forward movement would cause the flag to stream back. And since the Stars and Stripes is mounted with the canton next to the pole, that section would always be forward.

So if a soldier were charging into battle, the flag would give the appearance of forward motion. When worn on the right shoulder, the flag only appears to be backwards. And that's why soldiers wear the flag patches on the right shoulder backwards. Because retreat in battle, as any soldier will tell you, is not the Army way.

Ms. Burgess began her career in journalism in 1985 after graduating from the University of Chicago. She joined the Pentagon press pool in 1989, covering national defense topics for a variety of publications before joining Stars and Stripes in 2001. Ms. Burgess has a master's in national security strategy from the National War College and has twice been named as a Freedom Forum Fellow.

(Note: A variation of this article was printed in the 28 February 2004 European edition of *Stars and Stripes.*)

(Note: A change to Army Regulation 670-1, *Wear and Appearance of Army Uniforms and Insignia*, dated 5 September 2003, instructs all soldiers, regardless of deployment status, to permanently wear the U.S. flag insignia on utility uniforms. This includes battle dress uniforms [BDUs], desert BDUs [DBDUs], maternity BDUs, cold weather coats, air crew BDUs, and combat vehicle crewman [CVC] uniforms and jackets [cold weather]. The mandatory wear date is 1 October 2005.)

Environmental Compliance Officer Course

Twenty-five officers and noncommissioned officers (NCOs) of the 2d Infantry Division attended the first Environmental Compliance Officer (ECO) Course on the Korean Peninsula from 3-7 May at Camp Casey. Personnel from the Directorate of Environmental Integration at Fort Leonard Wood, Missouri, assisted the training management NCO with the development and instruction of this 40-hour Korea-specific course. Students learned to conduct environmental awareness training, perform self-assessments and environmental risk assessments, and coordinate with the installation environmental staff for assistance. Members of the Area 1 Environmental Office, Camp Casey Safety Office, HAZMART (handles hazardous materials disposition), Korea Regional Office (KORO) (U.S. Army), Center for Health Promotion and Preventive Medicine (CHPPM), 8th Army, provided briefings on their respective programs that relate to the environment. Army Regulation 200-1, *Environmental Protection and Enhancement*, states that commanders will appoint and train ECOs at appropriate levels to ensure compliance with environmental regulations. The Directorate of Environmental Integration can help installations develop an ECO course or other environmental training needs. For more information, contact Mr. Mike Walker at (573) 563-4119 or <*walkerm@wood.army.mil*> .

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