

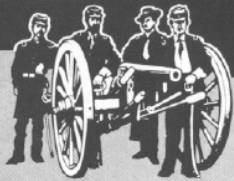
# Field Artillery Journal



March-April 1986

**GET FIRED UP  
OVER CSS**

# Field Artillery Journal



Volume 54

March-April 1986

Number 2

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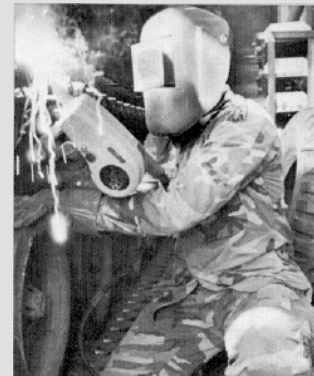
## Learn Logistics!

Over the years too many Redlegs have echoed Admiral E.J. King's observation, "I don't know what the hell this 'logistics' is . . . , but I want some of it." Such statements are borne of a training environment where leaders focus almost exclusively on the operational aspects of combat. Such self-delusion invariably yields to the harsh realities of true combat where most commanders share the Comte de' Guibert's lament: "What I want to avoid is that my supplies should command me."

This issue of your *Journal* provides an opportunity to explore the mysteries of combat service support and to grapple with the tough problems associated with resupplying, rearming, refueling, and repairing fire support units. What's more, this magazine gives mentors the tool they need to challenge the narrowminded views that logistical problems will solve themselves or that they are someone else's headache.

Paradoxically, field artillerymen are forever reminding their maneuver comrades of Maurice de Saxe's contention that "Every unit that is *not* supported is a defeated unit." Yet Redlegs all too often forget that artillery units also need support to succeed. Read this *Journal* and "get fired up" over combat service support.

EDITOR



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*Field Artillery Journal*

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# On the Move

## Synchronizing Fire Support and Combat Service Support

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MG EUGENE S. KORPAL



**C**ombat service support is a vital ingredient in effective fire support. Simultaneous execution of the rear, close, and deep operations requires more than mere synchronization of fires and maneuver; it necessitates the synchronization of combat service support with the overall scheme of operations. Although the Army has made tremendous strides toward improving combat service support—especially in the areas of rearming, repairing, and logistical command and control—much remains to be done. This is particularly true within the Fire Support Community which is so dependent on an unhindered flow of supplies and most critically ammunition.

This issue of the *Journal* focuses on combat service support as it applies to the Fire Support Community. It encourages Redleg professionals to review the Army's progress and to ponder the remaining challenges associated with this critical area.

### Rearming

To accomplish its mission the Field Artillery must ensure the flow of sufficient and appropriate ammunition to firing units. Our present plan envisions not only new equipment to ease the workload associated with handling great volumes of materiel but also streamlined resupply organizations. By achieving these two complementary goals, leaders should be able to distribute ammunition

to units on the battlefield at the right place and time.

The recent fielding of the field artillery ammunition supply vehicle (FAASV) and the 10-ton heavy expanded mobility tactical truck (HEMTT) represent significant steps in lessening the workload of soldiers handling ammunition in the battery area. Material handling equipment on both vehicles provides welcome relief to overworked cannoneers who face the difficult task of lugging ammunition along the line of metal.

Ammunition resupply operations remain quite labor intensive from the corps storage areas to the battalion trains. Fortunately, the palletized load system (PLS) promises to help remedy this problem by reducing not only ammunition transloading times but also the sheer amount of labor needed to move complete rounds. Through the use of the flatracks and preconfigured unit loads associated with PLS, corps transportation units and field artillery battalion ammunition sections will be able to move high usage ammunition from the corps storage area directly to the battalion trains where it can be transloaded in a matter of minutes.

Another important development in the rearming area is the warhead support platoon concept. Under this innovative scheme, combat service support elements will deliver nuclear warheads directly to firing units and prepare them for firing when required. Such organizations will eliminate the tremendous training and security burden now imposed on field artillery units.

### Repairing

In order to fight outnumbered and win the battle, tactical commanders must rapidly recover, repair, and return damaged equipment to the fight. Such operations become increasingly challenging as the Army fields more advanced systems and advocates operations in considerable depth. Nevertheless, rapid repairs well forward are achievable.

The USAREUR Support Structure Study Group recently provided such innovative recommendations as the increased use of diagnostic equipment. By eliminating guesswork and pinpointing the cause of malfunctions,

diagnostic equipment such as standard test equipment-extended (STE-X) can contribute significantly to lessening equipment downtime. The field artillery is building upon this concept by installing self-diagnostic features in the multiple launch rocket system (MLRS) and Firefinder radars. The Howitzer Improvement Program will go even further in this regard; the howitzer will actually have the prognostic ability to alert mechanics and operators to likely equipment failures before they occur.

### Command and control

Improving logistics command and control should be a matter of concern to all Redlegs. Fort Sill agencies are currently reevaluating ammunition resupply doctrine in an effort to enhance the tactical fire direction system's (TACFIRE) capabilities to manage class V better. In the future, the advanced field artillery tactical data system will link the Fire Support and Logistics Communities and will not only automate class V resupply procedures but also enhance performance of all battlefield logistics and personnel management tasks.

### Conclusion

Redlegs everywhere can take great pride in the strides made in synchronizing combat service support tasks with our fire support mission. But they shouldn't rest on their laurels. Much remains to be done!

Specifically, field artillerymen must:

- Take an active interest in learning how the logistic system works and in putting that knowledge to work during training.
- Articulate field artillery logistics requirements so the Combat Service Support Community will be able to support Redlegs better.
- Develop new and innovative ideas to make the logistic system work more efficiently and effectively.

Redleg leaders owe it to their soldiers to ensure they have the best combat service support possible. It's up to each of us—logistician and artilleryman alike—to combine our efforts into an effective, integral whole. Remember what General George S. Patton, Jr. said: "The onus of supply rests equally on the giver and the taker."



# Incoming

LETTERS TO THE EDITOR

## Leadership

### Induction into the Corps

I would like to pass on to my fellow Redlegs how the 6th Battalion, 14th Field Artillery (Warbonnets) recognizes soldiers promoted to noncommissioned officer (NCO) rank and how newly promoted sergeants are inducted into the NCO Corps.

• First, the battalion commander promotes every soldier to the ranks of sergeant and staff sergeant. This command attention lets the soldiers know that their commander and the command sergeant major are interested and aware of soldiers being promoted to NCO rank. These promotions occur at a battalion formation each month. They ensure that every man in the command witnesses that good soldiers get promoted to NCO rank.

• Second, a battalion noncommissioned officer Hail and Farewell occurs monthly. At this event, the battalion's NCO leadership formally welcomes each soldier who has been promoted

from specialist four to sergeant into the NCO Corps. In fact, each new NCO comes forward to receive a personal copy of the "Creed of the Noncommissioned Officer." The new sergeant reads the Creed aloud, signs the document, and receives a personal copy of the *Army Noncommissioned Officer Guide*, FM 22-600-20. If the new sergeant is assigned in a leadership position as outlined in AR 670-1, he also gets his Combat Leaders Identification—"green tabs"—and then joins his fellow noncommissioned officers for the remainder of the festivities.

This program has proven very successful. It has drawn the battalion's NCOs closer together and has given the newly promoted sergeant an increased awareness of his status and responsibilities.

D. R. Hamilton  
CSM, FA  
APO New York

### One Small Step

I applaud the establishment of an Army Writing Program but caution soldiers who think that such a program will bear significant near-term results. The truth is that the Army cannot effect the "quick fix" of the problem that stems from years of neglect.

The development of good oral and written communications skills starts in primary and secondary schools. Over the past 30 years we have seen much of this essential training—penmanship, phonics, grammar, diagramming, and composition—all but disappear from the classroom. Even when presented, such topics have often been watered down by inexact standards. Moreover, reading has been largely replaced by television watching and computer games. Perhaps it is no wonder that many soldiers have lost or never acquired the ability to communicate with one another.

As an ex-battalion commander, I can attest to the significance of this

loss. But I blame the individuals less than I blame the system. Ironically, the greatest loss is not manifested in a scarcity of well-written documents but in the time and struggle of many dedicated, hard-working souls who attempt to produce a document that captures their intent and expresses their feelings.

Because the art of communicating is so dependent on early training, there can be no effective, quick fix programs for adults. Certainly the Army must try. In fact, on a recent extended trip to Fort Leavenworth, Kansas, I was gratified to see a quality communications program in action. Unfortunately, it and other similar programs may be too little, too late; but it is definitely a limited step in the right direction.

Robert J. Bezek  
LTC, FA  
Chief, Doctrine Division  
Fort Sill, OK

### Redleg Reading

*This suggested reading list for field artillerymen comes from Brigadier General R. W. Crossley, Chief of Staff of V Corps. The editorial comments listed under each book are his own.*

—Ed.

**M. Caidin:** *The Tigers are Burning*  
No surprise! No success!

**Clausewitz:** *On War*  
(Translation by M. Howard and P. Papet)  
Best translation with reader's guide.

**R. Crisp:** *Brazen Chariots*  
Fighting outnumbered and winning.

**J. Eisenhower:** *The Bitter Woods*  
Intelligence failure . . .  
soldiers' success.

**D. S. Freeman:** *Lee's Lieutenants* The  
art of command . . . all  
three volumes.

**J.F.C. Fuller:** *Armored Warfare* The  
basis of blitzkrieg.

**H. Guderian:** *Panzer Leader*  
Modernization, doctrine,  
and tactics.

**B. H. Liddel Hart:** *Strategy*  
The indirect  
approach.

**C. Herzog:** *The War of Atonement*  
Trading on the courage of  
soldiers.

**A. Horne:** *To Lose a Battle*  
Ill-disciplined, soft  
soldiers lose.

**J. Keegan:** *The Face of Battle*  
The field-stripped  
battlefield.

**M. Von Manstein:** *Lost Victories*  
Combined arms  
synchronization.

**S.L.A. Marshall:** *Men Against Fire*  
About American  
soldiers.

*Field Artillery Journal*

- F. W. Von Melenthin:** *Panzer Battles*  
Name says it  
all . . . must  
read.
- G. Patton:** *War As I Knew It*  
How to lead.
- V. Peniakoff:** *Popski's Private Army*  
Dash and dare in small  
units.
- E. Rommel:** *Attacks and Rommel*  
*Papers (Infanterie Grief*  
*An)*  
Basic soldiering . . . still  
relevant.
- C. Ryan:** *A Bridge Too Far and Last*  
*Battle*  
Soldiers are magnificent  
men.
- B. Tuchman:** *Stillwell and the*  
*American Experience in*  
*China: 1911-1945*  
Disciplined and tough  
American soldiers win.
- D. Young:** *Rommel, The Desert Fox*  
The best of Rommel . . .  
attack, attack, attack.

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## Custodial Units

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### Response to "More Than Meets the Eye"

While Major Mark D. Studer's article "More Than Meets the Eye" (November-December 1985 *Field Artillery Journal*) provides a valuable insight into the inner workings and organization of detachment-type units, I feel the current image this type of assignment has within the Field Artillery Community merits further discussion.

Historically, the mission of artillery detachments originated as a result of various multinational agreements made during the Kennedy-McNamara era under provisions of the Foreign Military Sales (FMS) program. Today, these units provide critical technical support to our Allies who have purchased American designed and manufactured weapon systems. An analysis of personnel figures indicates that more artillerymen perform this mission at any given time than the sum of the personnel assigned

to any two division artillery-sized organizations.

The nine battalion-sized custodial units found worldwide are continuously misrepresented by titles such as Field Artillery Group or even Detachment. In fact, they are larger in some cases than a typical battalion or battery. The location of five of these groups in US Army Europe's 59th Ordnance Brigade enhances this confusing state of affairs by associating these artillery units with a combat service support organization. Efforts to redesignate these units as batteries or battalions have been stymied by the fact that this action would invalidate the original international Service-to-Service Technical Agreements (SSTA) that still cover these organizations.

Perceiving field artillery officers and soldiers assigned to such units as something less than "True Redlegs" constitutes a great injustice and disregards the critical duties they perform. Unlike most "real" artillery units which train in peacetime for a role in war, these units execute formidable peacetime missions as well as prepare for wartime roles. Actions on the part of terrorist groups, the peace movement, and the volatile nature of the European political environment enhance the difficulty of this peacetime mission. Located hours away from the nearest American community or separate command, these artillerymen work hard to bring pride and respect to the Army and the field artillery. Representing their country, these soldiers ensure their actions consistently reinforce those ideals and values we as a nation cherish and defend.

Obviously, soldiers assigned to these special units must meet extremely high reliability and proficiency standards. Providing capable leadership to these remarkable soldiers while exceeding established standards for both peacetime as well as wartime missions is a great challenge. Today's field artillery officers and their subordinate leaders are meeting that challenge. They have an opportunity to lead, with much more discretion and autonomy than is ever possible in an ordinary battalion.

The newly established Nuclear Warhead Detachment Course (NWDC) will help such company-grade officers learn even more about such assignments than ever before. Although the concept of a resident

course of instruction has helped undercut the notion that Redlegs in detachments are "second class artillerymen," this unfounded image still persists.

Elimination of this unsupportable distinction requires education. Artillerymen must learn that detachment soldiers often enjoy greater development and satisfaction than many of their line-battalion counterparts. Previously, we have asked "Why should artillerymen perform this mission?" I contend that the answer should be "Only artillerymen are capable of this task."

Steve Artman  
CPT, FA  
Fort Sill, OK

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### Far from Second Class

In his article "More than Meets the Eye" (November-December 1985 *Field Artillery Journal*) Major Mark D. Studer renders a great service to the field artillery by illuminating the diversified experiences and significant responsibilities of Redlegs serving in the warhead detachments. Specifically, the article serves us well by dispelling the perception that detachment command is a "second class" assignment.

The Chief of Artillery is currently sponsoring an initiative to upgrade the status of warhead detachment command to warhead battery command. Such a move recognizes the tremendous demands and inherent responsibilities associated with these important organizations. Moreover, his initiative elevates the detachment sergeant to first sergeant status.

Warhead detachments vary dramatically in size, mission, and location. Major Studer's article emphasizes detachments in Germany. The *Journal's* readers ought not forget that warhead detachments are also in Greece, Turkey, and Italy. Although their procedures and strengths differ, these commands are as Major Studer's article suggests "more than meets the eye."

Dennis C. Cline  
MAJ, FA  
Fort Sill, OK

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# Tactics and Techniques

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## A Redleg Solution Revisited

Captain Howard Lee's article "A Redleg Solution" (May-June 1985 *Field Artillery Journal*) proposes the use of battery commanders as battalion fire support officers. In doing so, it raises yet again an issue that artillerymen never seem to tire of debating. In fact, it's difficult to determine the source of this continuing fascination with "dual-hatting," but it probably derives from the American Army's penchant for emulating our British counterparts. After all, we brought back berets and adopted the black sweater, why not capitalize on the British scheme for manning fire support positions?

The answer seems obvious. Hats and sweaters are innocent assimilations, but when it comes to copying British artillery tactics and organization we had best be circumspect. What works for them may not work for us. We need hard facts that demonstrate that the British system is better than our own. Unfortunately, in advancing his solution, Captain Lee relied more on emotion and supposition than fact and reason.

Lee grounds his argument on two assumptions:

- The relationship between a battery and a maneuver battalion "roughly parallels" that between the parent artillery battalion and its supported brigade.
- Experience in a battery builds a base of knowledge which is transferable to duties as a maneuver fire support officer.

My experience suggests that neither of these assumptions is valid. When a battalion receives the mission of direct support, it adopts a one-for-one relationship with the supported maneuver brigade. Except under extraordinary conditions, this direct support mission applies to the battalion as a whole. Batteries do not receive a more specific mission of supporting a particular battalion. Fire support teams from artillery units habitually train with a battalion. But these relationships may not remain in combat situations.

When observers were organic to batteries, many a young artilleryman concluded that his battery must by logic be the one in direct support of the maneuver battalion to which the observers were normally dispatched. But in reality this extension of mission simply

does not exist unless an appropriate commander directs such a relationship using something like the dedicated battery concept.

One of the merits of consolidating the fire support teams (FIST) at the battalion level was that it broke this imagined bond existing between artillery batteries and maneuver battalions. Observers immediately recognized that they represented the artillery battalion and that it made no difference which firing unit was the nearest in range when they sent in their mission. This organizational change underscored the inherent responsibility of direct support artillery battalions to provide fire support teams and fire support officers. A battery cannot "technically" be in direct support because it no longer possesses the assets to do so.

This assertion has significant implications. When the battalion's leaders position their batteries, they do so using the criteria of where the battery can best support the entire brigade. In displacing by echelon or battery, a battery that was once best located to support a particular maneuver battalion may move to the other side of the brigade sector or zone. If that battery commander has been serving as a maneuver battalion's fire support officer, what would he do—abandon his battery or abandon the supported commander?

Captain Lee's argument suffers from several other flaws:

- The dual-hatted commander would not necessarily see the "big picture" any clearer than the present fire support officer.
- There is no reason to believe that the commander-fire support officer can coordinate with the S3 to mass fires with greater effectiveness than the present "single-hatted" fire support officer.
- The dual-hatted commander would face a horrific task when the supported maneuver battalion is in reserve.
- Having a battery commander playing fire support officer clearly creates enormous complications when the artillery mission changes to something other than direct support. The most likely outcome is that the maneuver battalion will be left without a fire support officer, a circumstance that will be unacceptable.

Lee's second assumption is that service as a battery officer lays the foundation for work in the fire support role. This axiom is certainly questionable.

The new lieutenant who starts out in a battery will hone his fire direction and firing battery skills, but are these skills required of a fire support officer or fire support team chief? To my mind they are quite distinct requirements.

Ironically, many would argue that early service with the maneuver units better prepares a Redleg to fill a position in a battery—a proposition which stands Lee's argument on its head. There is no question that experience beats inexperience every time, but the contention that an artillery basic course graduate works better for an artillery rather than an infantry captain is hard to document.

There is one circumstance during which the association of a battery with a particular battalion would be advisable: when the distances involved in the brigade sector make normal artillery command and control techniques impossible. This is the condition where the artillery commander would probably consider attachment as the solution to a bad situation.

Captain Lee's "A Redleg Solution" creates more questions than answers, and in general it proposes to fix a problem that is not that serious if artillerymen do their jobs. No solution save filling slots with qualified people will fix numerous personnel shortfalls. Furthermore, factors such as *experience* and *talent* are largely dependent on personnel management and institutional training processes.

But there is one more consideration which leads me to the conclusion that this is a largely circular debate. In the mid-1970s, when I was a battery commander in Europe, a group of British artillery officers came to visit our unit to acquaint themselves with our equipment and procedures. During the visit, we discussed the roles of the forward observer and fire support officer. After a lengthy debate one of the British battery commanders summarized the issue by stating: "Well, chaps, who can say which system is better. But the evidence is clearly on your side. After all, every time we've fought—you've won."

M. Thomas Davis  
MAJ, FA  
Washington, D.C.

## Tackling a Problem from the Top and the Bottom

I read Captain Howard Lee's article "A Redleg Solution" (May-June 1985 *Field Artillery Journal*) with some interest. I agree with Captain Lee that the problem he describes is a real one. We Redlegs talk about the combined arms team and supporting the maneuver force, but unfortunately we often do not put our money where our mouths are.

As chief of the 7th Infantry Division Fire Support Element and later as a battalion executive officer, I frequently found myself talking with senior artillery commanders about the assignment of fire support and cannon battery officers. You're right, Captain Lee! Although we recognized it as a *serious* problem, we *were* compelled to place our quality officers "where the rubber meets the road" in peacetime.

Lest anyone think we were the only ones concerned about this situation, I can recall other conversations with senior maneuver commanders whom we supported. It was tough to justify to them the priority system Redlegs followed!

Congratulations Captain Lee for going beyond the problem to propose a solution worthy of careful review, and for pointing out that, in part, the solution must come from the leadership of the Field Artillery Community.

Do we want company and battalion fire support officers positions to be filled by some of our "best and brightest"? Fine, then give the commander in the field a realistic assignment system and table of organization and equipment to do that. Captain Lee's ideas are good. No field artilleryman ever advised me to seek a forward observer or fire support officer job. Cannon battery jobs are the places to be. That's our tradition.

Simple preaching at the field to make this solution happen is not going to solve a system-wide problem. Yet, I've heard and read a lot that says "do it yourself" and "train better." Certainly those of us in the field can help, but I doubt it will be enough. I suspect we need to find the "Captain Lees" in our ranks and give them a chance to help improve the system from both the bottom and the top.

Leroy J. Buechele, Jr.  
MAJ, FA  
APO San Francisco

## Reserve Affairs

*This Reserve Component information comes from LTC Michael S. Langone, Chief of the Personnel Family Assistance Center for the Massachusetts National Guard.* — Ed.

### Who'll Be Left to Mind the Store?

Civilian and military personnel from the Department of the Army staff, Forces Command, National Guard Bureau, and scores of other Active and Reserve Component organizations recently attended a Family Assistance Course presented by the Community Service School headquartered at Fort Benjamin Harrison, Indiana.

The conference underscored one specific mission that warrants the attention of Redlegs worldwide: Every State Area Commander (STARC) is responsible to provide support to family members of mobilized Reserve Component personnel. This support is also to be provided to evacuated dependents of civilian and military personnel serving at overseas installations.

This is a monumental task. Once a state's National Guard units have deployed, the STARC's sections and individual

personnel will be the next to leave. If they deploy, who will be left to assist military family members? Where will a waiting spouse go for help? The answer is said to be retirees! I don't believe it.

Today many STARC pre- and post-mobilization organizations have no sections or personnel dedicated to perform the function of family assistance planning. In other commands such assignments are additional duties. Granted some STARCs have plans to associate themselves with certain state agencies—Social Rehabilitative Services Offices, American Legion, United Way, and the United Services Organization; but the prognosis for effective family support remains poor.

Appropriate commanders must tackle this problem head-on. They must approve post-mobilization tables of distribution and allowances that will work. They must dedicate resources to ensure success. All concerned must never forget that *the military family is our responsibility*.

### When Does 39 Days Equal a Year?

Today's National Guard includes men and women from all 50 states, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands. They are business people, skilled workers, professionals, laborers, and students. But some of their time is spent as soldiers and airmen. Of course, the luckiest Guardsmen of all are those who serve the guns.

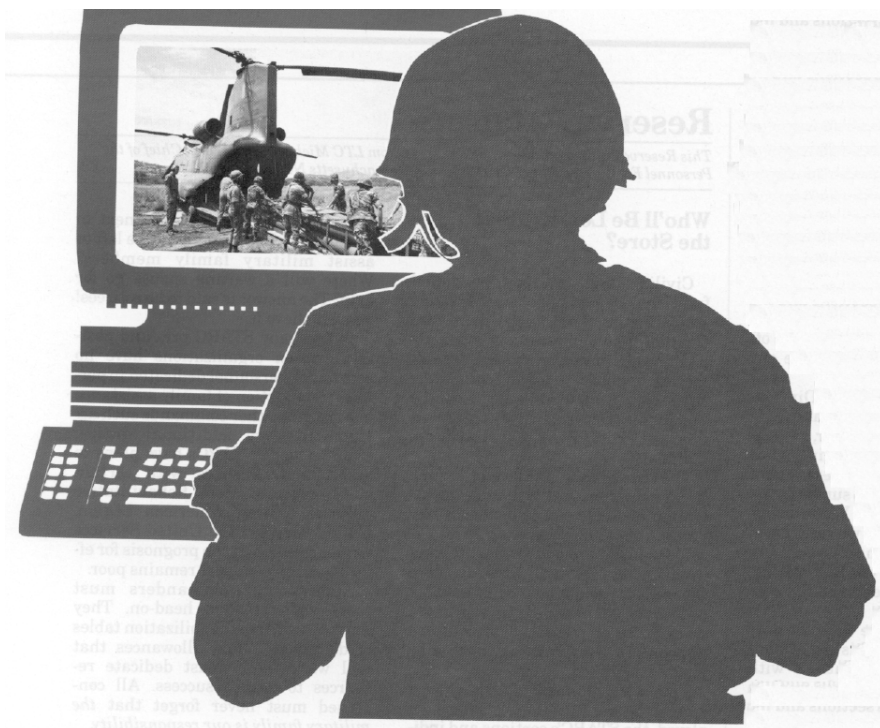
There are many factors that motivate these Redlegs to be the best that they can be. First and foremost is their pride—a pride steeped in tradition of patriotism. Second, a Guard member earns a good and steady income while learning valuable skills. What's more, Guard members make lasting friendships and business contacts throughout the 39 days of their military year.

A Guardsman and his dependents can shop at the post exchange and are entitled to commissary privileges during annual training. Life insurance is available.

The prospective Guardsman may also be enticed by the educational benefits. They include enlistment bonuses as well as financial assistance for educational programs. Specific eligibility criteria change periodically as military occupational specialty and unit requirements vary.

Upon completion of 20 creditable years of service, the Guardsman is eligible, at age 60, to receive a monthly retirement income and health benefits including medical care for himself and dependents as well as personal dental care with limited care for family members. Also, at age 60, the service member receives unlimited shopping privileges in the post exchanges and commissaries. Space available air travel benefits cover worldwide travel for the retiree and his family.

As in the days of the colonial Minutemen, the present Army National Guard artilleryman ought to be proud of his part-time career. In his 39 day-long year he does a great job for our nation, a country that recognizes his contributions.



# THE BEST ANSWER OF ALL

## A Logistics Support Battalion for the Field Artillery Brigade

by Lieutenant Colonel Bloomer D. Sullivan and Mr. Thomas L. Hills

The scene is the division tactical operations center. The daily operations briefing for the commander is in progress. "Sir, effective 0600 hours tomorrow, the 317th Field Artillery Brigade will be attached to the division. The assistant fire support coordinator will present a briefing on the field artillery support plan and the proposed organization for combat for the brigade's artillery battalions."

Such news will raise several questions in the minds of the logisticians present—

- Will the attachment be with or without logistics support?
- What is the brigade structure,

and what are its support requirements?

- How and where will it be employed?
- What kind of combat service support (CSS) assets are organic to a field artillery brigade?
- What corps support command (COSCOM) assets will accompany it?

These and dozens of other questions will come to mind, but for today's logisticians there are few references containing answers. This article will not only identify the unique operational characteristics of the field artillery brigade and its support requirements, but also offer a proposed logistics organization which is the best answer of all.

### The Current Situation

The field artillery brigade is a command and control headquarters in the truest sense of the word. It has but one organic unit—it's headquarters and headquarters battery. The brigade can, however, control up to six field artillery battalions at any given time. Whatever the configuration, the brigade and its battalion are totally dependent on external combat service support above the organizational level. Ironically, there is only one officer at brigade headquarters—a major with specialty code 92—assigned to plan and coordinate this external support.

Anticipated changes in field artillery organizations will exacerbate the problems confronting this lonely major and his brigade commanders.

For example, corps and division force structure changes resulting from the Army of Excellence (AOE) program significantly increase the number of artillery "firers" on the battlefield by introducing eight-gun, 155-mm batteries and six-gun, 8-inch batteries. Moreover, the multiple launch rocket system (MLRS) has joined field artillery forces. Although these additions result in increased ammunition resupply requirements, the geographical location of the COSCOM's ammunition supply points (ASP) and corps storage areas (CSA) have not changed. In consequence, the field artillery logisticians has an increased mission but lacks increased availability of resources.

Divisional ammunition transfer points (ATP) have been incorporated into the AOE division force structure. However, there are no COSCOM ammunition transfer points to support corps artillery units. Consequently, battalion ammunition convoys will have to travel 20 to 40 kilometers from their forward positions to obtain resupply. This arrangement results in a shortage of ammunition at the corps field artillery units because they cannot turn their resupply vehicles around fast enough to provide an uninterrupted flow of class V to the firing systems.

The total effect of such problems is that logistics support for the field artillery brigade is extremely problematic. This situation demands resolution. Today's logisticians must come to grips with field artillery brigade requirements and then work to fill them.



## Characteristics and Assumptions

There are nine general characteristics and assumptions that affect logistics support of field artillery brigades:

- The brigade will operate in the same geographical area as divisional field artillery units and have similar missions, but it will have a totally separate CSS chain.

- As shown in the table, field artillery brigades use two times the tonnage of supplies as other separate brigades operating in the division zone.

- The AOE force structure for the field artillery brigade is representative of most field artillery brigades. This constrained force consists of one 155-mm self-propelled howitzer battalion (3x8), two 8-inch self-propelled howitzer battalions (3x6), one MLRS battalion (3x9), and the headquarters and headquarters battery.

- The organization of the field artillery brigade will change frequently with the attachment and detachment of battalions to meet changing tactical situations.

- The field artillery brigade will operate in both the covering force area and the main battle area.

- Because artillery is almost never held in reserve, the brigade's support requirements will be virtually continuous.

- As now organized, the division support command (DISCOM) does not have the capability to support the field artillery brigade while supporting other fully-committed divisional organizations.

- The establishment of an *ad hoc* COSCOM support battalion to sustain a field artillery brigade would adversely affect the COSCOM's already austere capabilities.

- There are certain types of supporting units essential to the field artillery brigade. They include such organizations as a brigade materiel management center and a brigade data processing center—neither of which exists as separate entities in the COSCOM force structure.

## The Solution—A Support Battalion

The unique operational characteristics of the field artillery brigade and its considerable materiel requirements lobby heavily for the development of a combat service support battalion capable of supporting that organization. Obviously, that "type"

SUPPLIES REQUIRED	FIELD ARTILLERY BRIGADE	SEPARATE ARMORED BRIGADE	SEPARATE MECHANIZED INFANTRY BRIGADE	SEPARATE LIGHT INFANTRY BRIGADE
	STRENGTH - 3,293	STRENGTH- 3,842	STRENGTH - 3,972	STRENGTH - 3,695
CLASS I, VI - RATIONS AND PERSONAL ITEMS	16	19	21	18
CLASS II - GENERAL SUPPLIES	5	6	7	6
CLASS IV - BARRIER MATERIALS	16	16	17	16
CLASS V - AMMUNITION	2,617	1,242	1,242	1,242
CLASS VII - MAJOR ITEMS	7	8	9	8
CLASS VIII - MEDICAL SUPPLIES	1	1	1	1
CLASS IX - REPAIR PARTS	3	3	3	3
TOTAL	2,665	1,295	1,300	1,294

**Table of comparison for tonnage of supplies.**

nization would have to possess a number of latent capabilities including rearming, refueling, repairing, and caring for the supported brigade.

The mission of the support battalion's headquarters and headquarters company would be to command and control. The headquarters element would also provide liaison with the supported brigade headquarters, the COSCOM, and the DISCOM. In addition, it would feature a brigade materiel management center (BMMC), data center, communications platoon, and movement control center (MCC).

The BMMC would be the focal point for the brigade's supply and maintenance management. It would accomplish storage and distribution management for brigade stocks; receive and process requisitions; review and analyze demands; compute supply requirements and stockage levels; evaluate the workload and capabilities of supply and maintenance units; collect, sort, and analyze supply and maintenance data; and direct maintenance priorities in accordance with operational guidance.

There are two keys to successful BMMC operations:

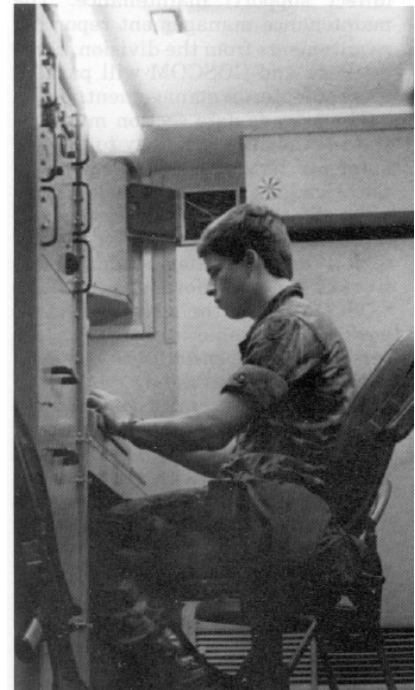
- First is continuous coordination with the field artillery brigade staff. This will ensure that the BMMC is aware of any units attached to or detached from the brigade and any major repositioning made within the area of operation. This knowledge will drive a host of other actions affecting unit support.

- The second key is adequate, flexible computer systems complemented by reliable communications. Software for the BMMC must be some of the most flexible available. Computer file parameters will vary considerably as the number of customer battalions increases and decreases. The capability for automated "unit file dumps" as well as "unit file builds" must be included so that demand history related to the particular units being detached can rapidly be extracted from the data base and communicated to the gaining

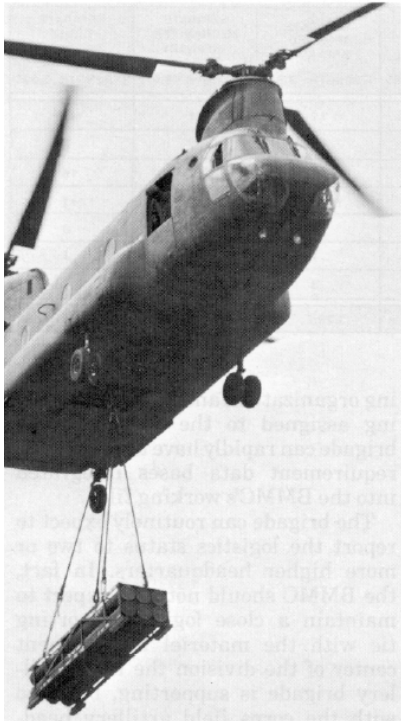
organization, and so that units being assigned to the field artillery brigade can rapidly have their support requirement data bases integrated into the BMMC's working file.

The brigade can routinely expect to report the logistics status to two or more higher headquarters. In fact, the BMMC should not only expect to maintain a close logistics-reporting tie with the materiel management center of the division the field artillery brigade is supporting, but also with the corps field artillery headquarters and the corps materiel management center.

The BMMC would also perform maintenance management functions for the brigade and be linked with the



**Reliable communication links will ensure continuous coordination between the brigade materiel management center and the field artillery brigade staff.**



**The movement control center in the support battalion headquarters will provide control of transportation assets organic or allocated to the brigade.**

COSCOM for backup intermediate (direct support) maintenance. The maintenance management reporting requirements from the division, corps artillery, and COSCOM will parallel those of materiel management.

The brigade data section must use state-of-the-art technology to provide automatic data processing support to the brigade. It must be capable of handling all automated transactions and serve as the brigade's interface for digital communication of administrative and logistics information with the COSCOM. With the advent of small, powerful, portable computers, this section might eventually be partially or completely eliminated.

The movement control center in the support battalion headquarters would provide control of transportation assets organic or allocated to the brigade and act as liaison with the corps movement control center.

## The Medical Company

Composed of a headquarters element, a brigade surgical section, an ambulance platoon, and a clearing platoon, the medical company would provide division-level medical support to the brigade. The headquarters element will provide command and control and contain

the brigade medical supply office. Headed by the brigade surgeon, the surgical section will perform surgical, dental, optical, and psychiatric duties. The ambulance platoon will evacuate casualties from the battalion aid stations to a clearing platoon. Ambulance evacuation for the field artillery brigade may require more-than-normal assets because of the distances that casualties must be moved. The clearing platoon should also provide general medical and dental care to assigned or attached units in addition to coordinating the evacuation of casualties.

## The Maintenance Company

The maintenance company will provide intermediate (direct support) mechanical, electrical, and electronic maintenance; repair parts supply support; stockage and replacement of brigade maintenance floats; and technical assistance to customer units. The company should be able to receive, store, and issue the repair parts and maintenance materials required by supported units and its own platoons. Moreover, it can provide technical assistance to supported units, furnish limited recovery support, and operate a direct exchange service for selected items. This company requires tremendous built-in flexibility in order to meet the needs of the brigade as the weapon system types and densities change with changing missions.

The maintenance company would require a base organization augmented by maintenance teams to support the unique weapons mix of the battalions assigned to the brigade. These COSCOM teams will provide direct support maintenance to a specific type of artillery battalion. They would revert to COSCOM control when the battalion is withdrawn or reassigned to another brigade. The organizational base for the maintenance company would consist of a headquarters section; three forward support platoons; and a light equipment, maintenance-technical supply-float platoon.

The forward maintenance platoon headquarters would exercise command and control of the maintenance teams attached to it and stock limited authorized stockage list items for weapon systems it supports. The forward maintenance platoons would normally provide intermediate (direct support) maintenance to the units of the field artillery brigade on an area basis. They might, however, have a permanent relationship with a unit or units. These platoons would fix weapon systems as far forward and as quickly as possible. They must have mobile, survivable equipment

capable of operating where the weapon system branches down. Moreover, each platoon must have a limited evacuation capability.

The heavy maintenance platoon provides backup intermediate (direct support) maintenance to the forward support platoons. It would also be the primary intermediate (direct support) maintenance unit for MLRS and Lance battalions.

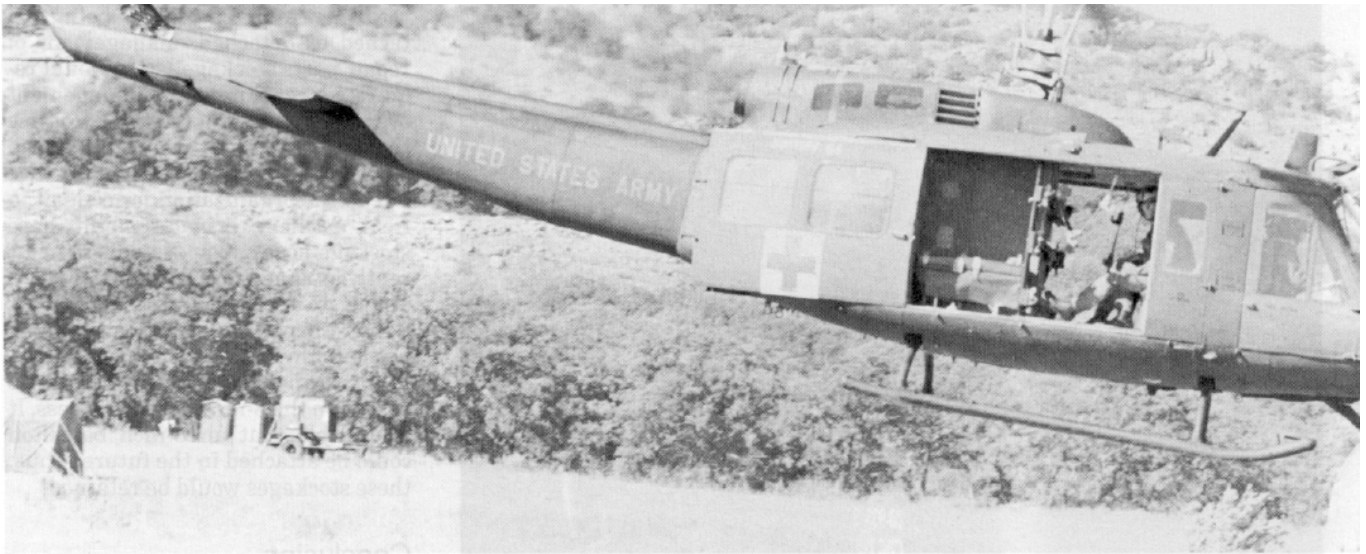
The light equipment, maintenance-technical supply-float platoon would perform electronic maintenance for the brigade, as well as accomplish calibration and limited repair of textiles, chemical equipment, and small engines. This unit would also be responsible for operating the brigade technical supply section and receive, store, issue, and ensure mobility of the brigade authorized stockage list.

## The Supply and Transport Company

The supply and transport company would provide the brigade's units with all classes of supplies except for classified maps, communications security materials, and classes VIII and IX items. It would also dispose of unserviceable equipment, supply unclassified maps, operate a central issue facility, run water purification service, and augment the field artillery unit's organic ground transportation for movement of both supplies and soldiers. In addition, the company should have enough soldiers and equipment to operate two or more ammunition transfer points in support of the brigade. When augmented, the supply and transport company can provide limited graves registration services, clothing exchange, and bath services.

To fulfill these responsibilities, the company would need a headquarters section, a supply platoon, and a transportation platoon. The headquarters section would provide command and control, maintenance, internal supply, food service, and unit administration.

The supply platoon would serve as the focal point of activity within the supply and transport company. It would be composed of a headquarters element; a class I-class VI section; a class III section with a 60,000-gallon fuel system supply point and 5,000-gallon tankers for bulk fuel distribution; a class II-, IV-, and VII-section; and a class V section capable of operating two or more ammunition transfer points for conventional howitzer, MLRS, and Lance ammunition.



**Ambulance evacuation for the field artillery brigade may require more-than-normal assets because of the distance casualties must be moved.**

The transportation platoon composed of two light truck squads with 5-ton dropside cargo trucks and trailers and a medium truck squad with 5-ton tractors and 22½-ton stake and platform trailers would haul much of the brigades supplies. The brigade materiel management center would provide the technical control for supply and services activities of the supply and transport company, and the movement control center would control transportation services.

The service platoon—a wartime augmentation—provides services such as graves registration, clothing exchange, and bath services.

### Supporting the Brigade

With this force structure, combat service support to the field artillery brigade would be similar to that provided divisional units. Two classes of supply—class V (ammunition) and class IX (repair parts)—require special mention.

The battalion would provide ammunition to the units of the field artillery brigade through supply point distribution at its ammunition transfer points. Units would draw chemical munitions from the chemical ammunition supply point operated as a part of the corps ammunition supply point system. Special ammunition would be available at special ammunition supply points.

The brigade commander would control the ammunition within the ammunition transfer points. As a rule, these points would stock large-caliber, high-usage rounds for the particular weapon system mix within the brigade. If there is a mixture of 155-mm and 8-inch weapon systems in the brigade, the ammunition transfer points carry both calibers, unless positioning of field artillery battalions precludes. Ammunition with low consumption rates such as smoke, Copperhead, and family of scatterable mines would normally be drawn by units directly from the corps ammunition supply points.

Under the proposed concept, the brigade ammunition officer (BAO) would be the brigade commander's manager for ammunition and would serve as the link between units of the brigade, the corps materiel management center, and ammunition supply points to ensure that the transfer points were always properly stocked. He would also ensure that the supply points were aware of brigade requirements and that brigade units were complying with official guidance.

The brigade's ammunition transfer points must be fully mobile, operating from 22½-ton, tractor-trailer combinations driven by drivers from corps transportation units. Based on coordination



**The maintenance company will provide intermediate (direct support) mechanical, electrical, and electronic maintenance.**



**The ammunition transfer points will carry a mixture of 155-mm and 8-inch weapon systems in the brigade unless precluded by positioning of field artillery battalions.**

with the corps materiel management center, these tractor-trailers would arrive at the brigade ammunition transfer points on a scheduled or "call-forward" basis, depending on the situation. As field artillery units require ammunition, their vehicles would move in miniconvoys to the transfer point which stocked the required ammunition. After the brigade ammunition officer representative verified the quantities requested, ammunition transfer point personnel would issue the resupply. A similar operation would occur at the corps ammunition supply point.

Coordination between the brigade ammunition officer, corps materiel management center, and ammunition supply point would be particularly critical as units join and depart the brigade; as a major repositioning takes place; and as mission changes occur which affect the mix of munitions. The brigade S3 would inform the brigade ammunition officer of these changes because the time required by the corps materiel management center and ammunition handling units to effect changes in ammunition transfer point munitions or locations might well be significant.


Due to the variable nature of the field artillery brigade, the resupply of repair parts might require unusual management practices. Normally, brigade units will stock items on a combat-essential prescribed load list (PLL) as directed by the brigade commander and higher headquarters' policy. Units requiring replenishment stocks would place the requirement on the forward support maintenance platoon located in the battalion support area. The forward support platoon would maintain items of a limited authorized stockage list (ASL) on mobile vans. Battalion personnel would use these items to support intermediate (direct support) maintenance performed by the forward support platoons.

If a unit's requirement could not be met by the authorized stockage list in the forward support platoon or if the platoon required repair parts not available to complete a direct support repair, these requirements would go to the brigade materiel management center which would direct shipment of the part from the technical supply (repair parts) platoon of the maintenance company. The technical supply platoon would maintain an

authorized stockage list as directed by the brigade commander and in accordance with theater policies. The list would be 100-percent mobile in MILVANS, stake and platform trailers, or other vehicles.

An unusual feature of the field artillery brigade authorized stockage list is that because of the variable nature of weapon systems and densities resulting from battalions being attached or detached, management of repair parts stockage levels would require a large number of management override actions to preclude excessive turbulence within the authorized stockage list. It is conceivable that due to the organization for combat, a field artillery brigade might have stockage for weapon systems not currently assigned to the brigade. For example, an authorized stockage list for 8-inch weapons might be maintained without any 8-inch systems assigned. While the normal procedure would be to turn in the 8-inch parts as excess, it is possible that an 8-inch battalion could be attached in the future. Thus, these stockages would be retained.

## Conclusion

The Logistics Community must come to grips with field artillery brigade requirements and develop definitive doctrine regarding support for such organizations. Field artillerymen and logisticians alike must understand that doctrine and force structure must be programed to meet these needs. Only then will the combined arms team produce the best answer of all to the perennial problem of field artillery logistics. 

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**Mr. Thomas L. Hills is a field artillery specialist with the Threat Scores Branch of the Concepts and Studies Division at the Directorate of Combat Developments at Fort Sill, Oklahoma. Mr. Hill served as an Army captain and is a graduate of the Field Artillery Officer Advanced Course.**



# Keep Those Caissons Rolling

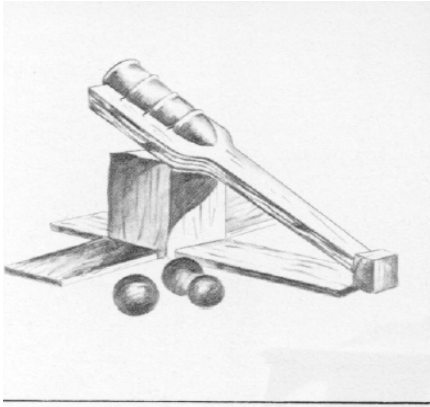
by Captain Jerrold D. Weissinger, USAR, and Mr. L.T. Couvillion

**T**he artillerist of the fourteenth century was more of a demonic demolition engineer under contract to the government than he was a military man. Even his employers viewed him as being in a league with magicians and alchemists. The fact that early gunners made their ammunition on-site by shaping stone projectiles and mixing serpentine powder from supplies of charcoal, sulphur, and saltpeter reinforced these notions.

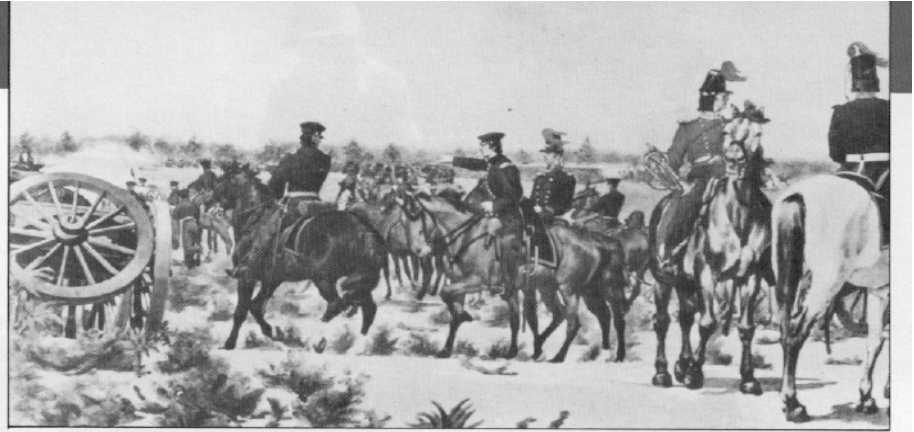
The truth was that most of the early gunners were eminently practical and innovative men. As their weapons became more sophisticated and the site-worked stone projectiles began to wreak havoc with the weapons' bores, ingenious artillerymen began precasting their shots using

lead, brass, or iron. The gunners also experienced problems with powder. During transportation on the rough roads of the time, the components of the serpentine powder separated—the heavier saltpeter and sulphur settled to the bottom and the lighter charcoal rose to the top. Ever resourceful, artillerymen turned to corning their powder. They mixed it wet and then crushed the powder into smaller grains. This method increased the strength of the powder and ensured more uniform performance.

This pattern of innovativeness also extended into the realm of ammunition transport techniques. For many years, civilians transported the artillery. The pieces would be in transit somewhere in the column,



**The fourteenth century cannon with siege mounting required early gunners to make their ammunition on-site.**



**Major Samuel Ringgold directs operations of his battery against the Mexicans at Palo Alto in 1846.**

ammunition elsewhere, and cannoners—if *trained* cannoners were employed—would be mixed among the other troops. Assembly of all these elements into a functional firing battery could take days.

The ascendancy of Frederick the Great of Prussia in the mid-eighteenth century marked a turning point in military organization in general and artillery transport in particular. His reforms led to the emergence of professional armies in which noncommissioned officers received dictatorial powers; troops marched in cadence; and military horses guided by military drivers rather than civilians began to pull artillery pieces. Ammunition was still separated from the weapon, but artillery units had become a reality.

In the early nineteenth century, under the direction of Secretary of War Henry Dearborn, the United States Army adopted with some modification Frederick's artillery system. During this time, a small amount of ready ammunition was carried on the gun. Cannoners rode separate horses, or they found a perch on either light transport or ammunition wagons. Captain George Peter united the major elements of his battery—the gun, ammunition, horses, and cannoners—into a compact, maneuverable artillery unit capable of rapid movement, deployment, and recovery. This system proved very effective, but was discontinued in 1810 for economic reasons.

In 1833, Major Samuel Ringgold drew on Captain Peter's ideas to organize a light artillery battery which employed the 6-pounder gun. A caisson limber and six horses with a driver on each team towed the gun. Another caisson limber and six horses towed a caisson for each gun. This combination of sufficient animal traction and professional military drivers gave the artillery batteries the speed and stamina necessary to follow the rapid movements of cavalry units. A pair of ammunition chests on the caisson and a chest on each of the limbers provided approximately 120 rounds of cannister and shot. This "flying battery" system remained the centerpiece of American field artillery until 1941 and the adoption of mechanization.

In 1897, a great design revolution in field pieces took place with the introduction of the French 75-mm gun. The breech-loading French 75 allowed cannoners to move from their exposed positions at the muzzle to a safer haven at the

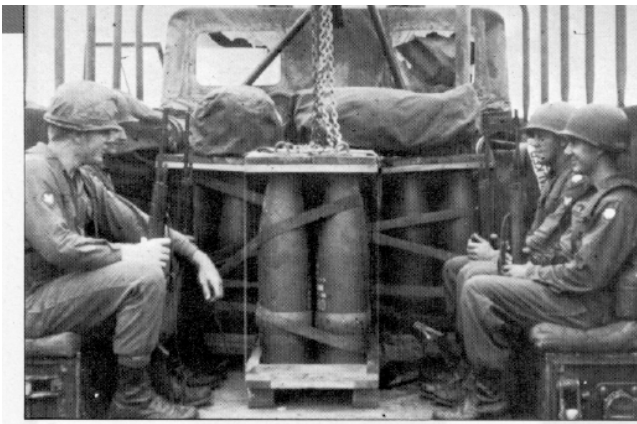
rear of the piece. Moreover, the weapon's recoil system eliminated the need to roll the gun back into the battery after each shot. The caisson moved to a position beside the gun. Cannoners could then crouch behind it and the cannon to gain relative safety from bullets and shell fragments.

In 1916, animal power gave way to mechanical traction, but guns and caissons still served side-by-side. By 1920 the Army had set out to develop fully-mechanized ammunition support vehicles known as mechanized or motorized caissons. These vehicles were general-purpose cargo haulers which provided no specific storage techniques nor any ballistic protection for the crew or ammunition. With the need for increased speed and mobility, the Army moved away from tractors and started using trucks and self-propelled howitzers.

In an attempt to provide an ammunition vehicle equal in mobility to that of the self-propelled howitzer, the field artillery designed the M548 in the early 1960s. This relatively vulnerable carrier remains in use today.

Unfortunately, the M548 has numerous deficiencies which make it inadequate. On the AirLand Battlefield with its rapid movements and high volumes of fire, field artillery batteries have become a high priority target. In this intense counterfire environment, crew and ammunition survivability demand hardening. The 20-year-old M548's lack of ballistic protection for the crew and ammunition seriously jeopardizes a vital portion of the indirect fire system. Furthermore, its limited mobility and marginal reliability also undercut the capabilities and responsiveness of the cannon systems it serves.

In 1978, the Legal Mix V Study and data generated by US Army Systems Analysis Activity underscored the urgent requirement for a ballistically protected ammunition support vehicle. An initial effort to improve the M548 began. The virtually immediate result was the M548 "stretch." Although the vehicle added armored protection which covered only the cargo area, it could haul 3,000 pounds less in payload. Moreover, the stretch provided no material-handling equipment to reduce labor-intensive ammunition handling requirements; and its payload and mobility remained inferior to that of the supported howitzers.



**Ammunition vehicles of the past had limited storage capabilities and left crew members unprotected in the cargo area. The lack of ballistic protection for the crew and ammunition could seriously jeopardize a vital portion of the indirect fire system.**



**Soldiers load ammunition rounds into a field artillery ammunition support vehicle.**

The M548 stretch was a reasonable "quick fix," but it was not a viable candidate for the next generation of ammunition vehicles. Based on various studies, coordinated requirement documents, and extensive testing of prototypes designed by Bowen-McLaughlin-York, combat developers eventually outlined the characteristics of a field artillery ammunition support vehicle (FAASV).

The resulting system underwent numerous tests during its development cycle to ensure that it could meet all requirements. Based upon a modified M109 chassis, the FAASV prototype was first tested in 1979 during a concept evaluation program at Fort Sill, Oklahoma, by the US Army Field Artillery Board. Initial testing established the fact that the vehicle was capable of achieving the desired goals for an ammunition vehicle. However, numerous hardware and human factor problems demanded attention. Fortunately, none defied resolution during the accelerated full-scale engineering development phase that followed.


Development and operational testing of the system occurred at Yuma Proving Ground, Arizona, and Fort Sill in 1982. Deficiencies detected during those tests were corrected during the course of the tests. Both tests clearly demonstrated that the vehicle met the required goals even though some hardware deficiencies still needed to be corrected prior to full-scale production.

Like the caisson for the French 75-mm gun, the FAASV serves as the location where crew members prepare ammunition for firing. But unlike the old system, the FAASV will mechanically transfer the rounds to the awaiting howitzer via a hydraulically powered conveyor. FAASV resupply operations will normally occur in a protected position within the battery area or in the vicinity of the howitzer if the situation dictates. This mating of the howitzer and its ammunition vehicle achieves survivability and mobility levels absolutely essential for the implementation of AirLand Battle doctrine.

The FAASV not only carries 12 percent more 155-mm ammunition than the M548, but also stores a 10 percent overage of propellants and fuzes. The FAASV configured to support the M110 will carry 38 percent more 8-inch ammunition and allow for a 10 percent overage of propellants and fuzes. Moreover, the ammunition in both versions of FAASV is individually secured and extremely accessible.

In March 1983, the Army type classified the FAASV for limited procurement. Further testing will evaluate the "fixes" to the remaining material problems; but the Army currently plans to acquire 975 vehicles to be fielded in US Army Europe. Even though there is an initial requirement for 2,500 vehicles, budget constraints currently prohibit acquiring this quantity.

All told, the FAASV is a winner. As the Legal Mix V Study revealed, a ballistically protected ammunition support vehicle could provide a 45 percent reduction in crew vulnerability. This fact alone—without considering the effects of nuclear, biological and chemical protection, mobility enhancement, and material handling equipment—makes the FAASV a significant combat multiplier.

In the spirit of centuries of artillery developments, the FAASV is yet another significant stride toward improving the field artillery. Like its venerable ancestors, it will play an important role in the overall fire support system. The caisson is back—let's keep those caissons rolling! 

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**Mr. L.T. Couvillion is the artillery curator at the US Army Field Artillery and Fort Sill Museum at Fort Sill, Oklahoma.**



# *Wait for the Wagon!*

## *Combat Service Support for the Civil War Battery*

by Major Jerry D. Morelock

"Artillery officers should make themselves thoroughly acquainted with the natural history of the horse!" These words from the United States War Department's *Instruction for Field Artillery*, exhorted the field artillery officer of the Civil War era either to become thoroughly familiar with all aspects of the care and handling of horses or suffer the inevitable consequences—an inefficient and unreliable battery. What's more, much as the Defense Department today establishes strict specifications for vehicles procured by the Services, the War Department in 1861 published detailed specifications for the four-legged prime mover of Civil War artillery:

*Description—age at date of purchase, 5 to 7 years; height, 15 hands 3 inches, allowing a variation*

*of 1 inch. They should be well broken to harness; free from vice; perfectly sound in every respect; full chested with shoulders sufficiently broad to support the collar but not too heavy; full barrelled with broad, deep loins; short coupled with solid hind quarters.*

This article surveys the combat service support available to the Civil War artillery battery. It touches on all aspects of the logistics of that era with particular emphasis on one important ingredient—*horsepower*. Due to the scarcity of surviving records for the Confederate Army, as well as that army's generally inefficient and overwhelmed supply system, this survey deals only with the support of the United States Army.

### **Support for President Lincoln's Army**

Union artillery batteries profited from generally efficient and effective logistical systems. Such systems resulted largely from the efforts of the Quartermaster Department, ably assisted by the Subsistence, Medical, Pay, and Ordnance Departments. Like the rest of the tiny Federal Army at the outset of war, the Quartermaster Department was small, overworked, and largely neglected. Nevertheless, Army regulations specified that this organization:

*Provide the quarters and transportation of the Army; storage and transportation for all army supplies; army clothing; camp and garrison equipment; cavalry*



*and artillery horses; fuel; forage; straw; material for bedding, and stationery . . . supply posts with water; and generally the proper and authorized expenses for the movements and operations of an army not expressly assigned to any other department.*

Providing such supplies and services presented a monumental task to the few regular soldiers assigned to the Quartermaster Department in 1861. Forage requirements alone necessitated the procurement of 2.5 million bushels of grain and 50,000 tons of hay monthly. Nevertheless, Quartermaster General Montgomery C. Meigs developed a streamlined organization which kept up with the rapidly expanding Federal Army.

At every level, quartermaster officers exercised general supervision over subordinate department officers, although all were subject to the orders and instructions of their respective unit commanders. Assisting the officers of the Quartermaster Department were the soldiers of the other combat service support departments:

- The Subsistence Department was primarily responsible for contracting the procurement of troop rations.
- The Medical Department requisitioned all medical and hospital supplies, operated hospitals, and managed the overall medical care of Union troops.
- The Pay Department disbursed pay and allowances to all officers and enlisted soldiers, and ensured prompt collection of debts owed the US Treasury.
- The Ordnance Department not only ran all arsenals and armories but also furnished all ordnance and ordnance stores for the service. These stores included: all cannon, artillery carriages, small arms and accoutrements, ammunition, horse equipment,



**Keeping the four-legged prime mover of Civil War artillery in shoes was a constant concern for the military. Field artillerymen had to become thoroughly familiar with the care and handling of horses to keep the batteries efficient.**

tools and materials for ordnance service, and horse medicines and materials for shoeing.

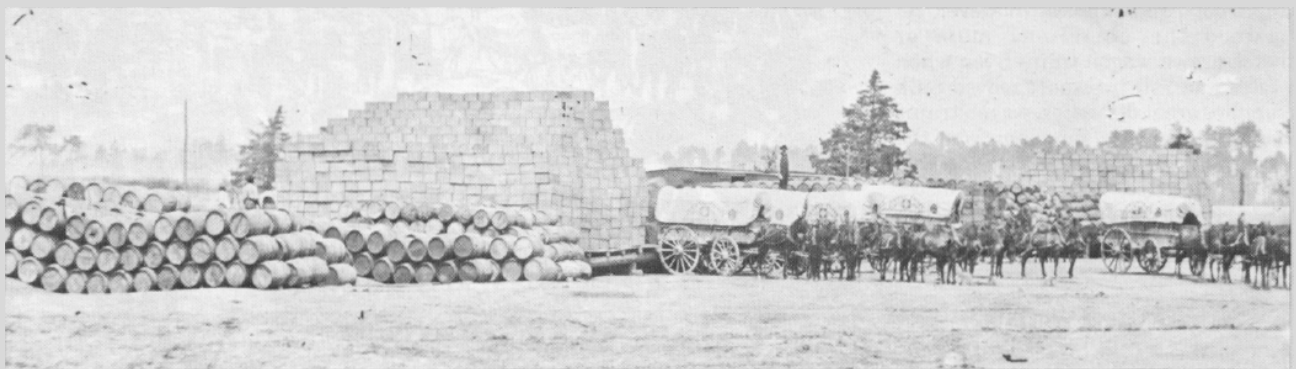
### Civil War Transportation

An elaborate system of communications and transportation linked all the logistical departments. The widespread use of the telegraph allowed commanders and staff officers at all levels to pass orders, requisitions, and instructions up and down the chain of command quickly and reliably. President Lincoln made daily trips to the War Department where he spent hours poring over the telegraphic reports of his field commanders and prodding them to action with his messages. On the battlefield, signal corpsmen established semaphore stations to transmit commands. Balloons were often used to provide battlefield observation and transmit information.

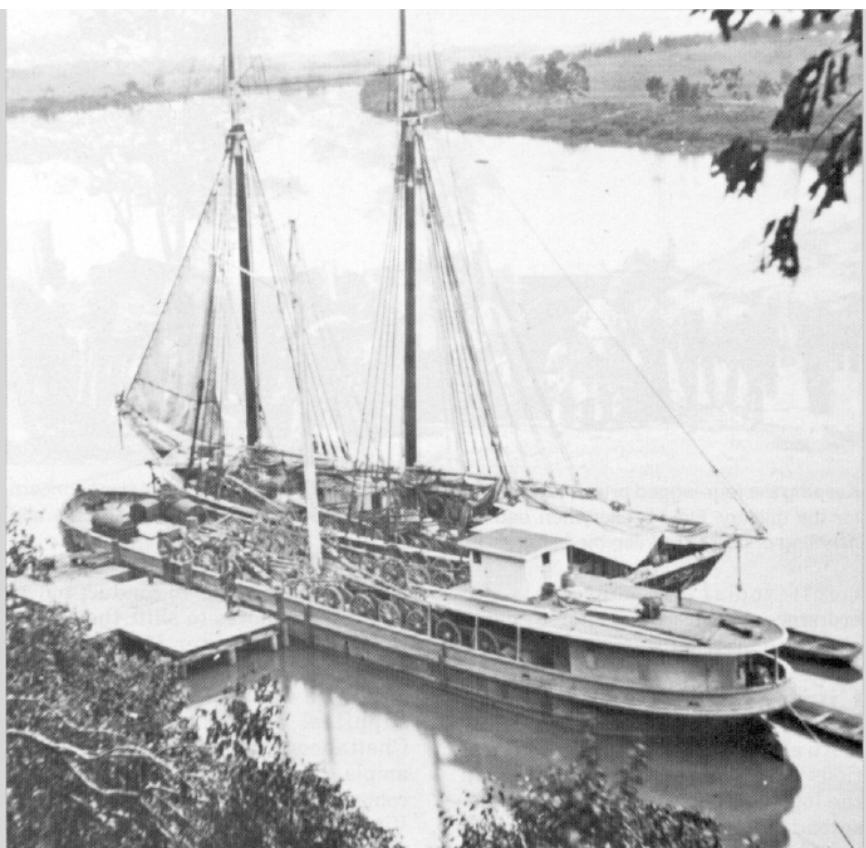
The railroad provided an unprecedented degree of mobility from theater to theater and geographical department to department. Both sides

used their railroads to conduct moves and countermoves to shift the battlefield balance of power. Moreover, they used the railways routinely to transport huge amounts of equipment and supplies. In the Chickamauga-Chattanooga campaign of 1863, for example, Longstreet's corps, which had come from Lee's Army of Northern Virginia to Bragg's Army of Tennessee via rail, gained an early advantage on the bloody field at Chickamauga. But Federal forces countered that effort with their own rail movement as Hooker's corps from the Army of the Potomac reinforced the hard-pressed Army of the Cumberland. The result of this strategic move was to break Bragg's stranglehold on Chattanooga.

Federal leaders also used river and sea transport to maintain a steady stream of troops and supplies to their field armies. Especially in the West where an extensive network of navigable rivers existed, river transportation played an indispensable role. Protected by gunboats, steamers provided



**A Civil War era commissary depot stored most of the supplies for the troops. Military wagons transported goods from the depots to the units.**



**Federal leaders used river and sea transport to maintain a steady stream of supplies to their troops.**

the Western armies combat service support in an area where road networks were poorly developed and even more poorly maintained. The typical 500-ton river steamer could carry enough supplies in one trip to sustain a force of 40,000 men and 18,000 animals for at least 2 days. Although river transport was seasonal, it complemented the expanding railroad network and proved more than sufficient to keep pace with the advancing armies.

The most common method of moving troops and supplies, however, remained the ubiquitous mule or horse-drawn wagon train. Even when water and rail transport moved bulk supplies great distances, wagon trains were necessary to get them from the depots to the troops. To provide this critical service, the Quartermaster Department primarily employed a well-designed, practical wagon, pulled by a six-mule team.

Quartermasters organized the wagon trains into headquarters trains, regimental trains, and the general supply trains. The headquarters and regimental wagons transported

baggage and supplies which needed to accompany the army; the general supply trains moved stores between



**A typical artillery unit was supported by an overwhelming number of men and their mounts.**

large depots and unit supply locations. The numbers of wagons accompanying the army in the field was a constant source of friction between regimental commanders, each of whom sought to justify the need for more wagons from the scarce holdings of higher headquarters.

An additional problem confronting quartermasters with the field armies was the constant attempt by civilian sutlers to transport their goods in military wagons. These appointed, regimental merchandisers sold a variety of hard-to-obtain food and equipment to soldiers. Despite efforts to control these entrepreneurs, they frequently were able to move their goods including prohibited items such as whiskey in Army wagons. Money was tight for most sutlers and the temptation to use government transport for personal gain was great.

Northern factories and fields produced all types of equipment and supplies vital to Civil War combat service support, but horse and mule power tied the logistics together. The daily operations of the Civil War field artillery battery centered around these animals. Photographs of artillery units typically show a line of six small cannon, nearly overwhelmed by a mass of horseflesh and harness. Scattered on and around the carriages or sitting on the horses are the grim-faced artillerymen, poised for "action front."

## Personnel Support for the Civil War Battery

Of course, the businesslike War Department also established standards for men volunteering to become Redlegs:

*The number of men required for the service of a battery . . . varies from 20 to 30 per piece, according to circumstances. The number for field service should never be less than 25, even in 6-pounder batteries. They should be intelligent, active, muscular, well-developed, and not less than 5 feet 7 inches high. A large proportion should be mechanics.*

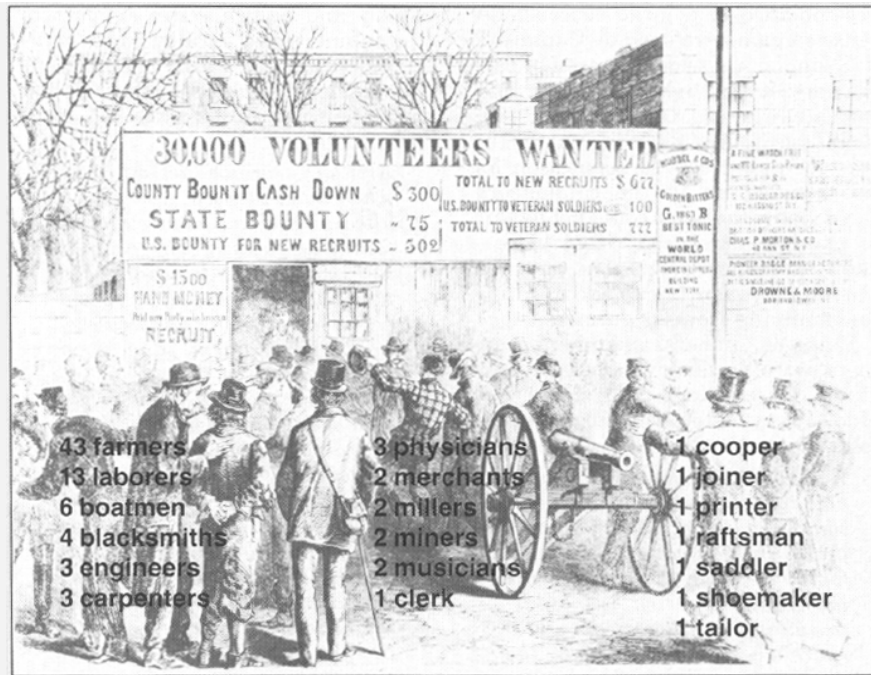
The Civil War battery commander molded these men into an organization which typically contained 5 officers, 150 enlisted soldiers, and 110 to 150 horses. A lieutenant commanded each of the battery three two-gun cannon sections, and a fourth lieutenant led the line of caissons during actions. The battery first sergeant and quartermaster sergeant were known as unit "staff sergeants," and each of the six "chiefs of piece" was a sergeant. There were two corporals, a gunner and a chief of caisson, as well as an "artificer," or mechanic, per piece. Two buglers, 52 drivers, and 70 cannoneers rounded out the battery.

Men from all walks of life filled the ranks, and the personnel records of one volunteer unit provide us with an interesting glimpse of the Redleg of that day. As shown in the figure, the 2d Illinois Light Artillery—a unit which fought several campaigns in the Western Theater including the bloody battle at Chickamauga—attracted a broad diversity of civilians during its initial recruiting efforts in 1861.

A new group of recruits in 1864 contained only 29 farmers but added new occupations—painter, baker, bartender, butcher, druggist, mason, and a teacher—to the list. The battery's average age in 1861 was 27; only two "old men" of 51 were among the ranks. In 1864, nearly half the battery's recruits had been born outside the United States.

Battery commissioned and noncommissioned officers forged such diverse groups of men into effective teams through drill, drill, and more drill. War Department instructions such as those that follow laid out the specific training procedures:

*The cannoneers fall in two ranks, 18 inches between the*



**Men from all walks of life filled the artillery ranks.**

*ranks; elbows slightly touching; and in such manner that they may be told off to the duties at the piece for which they are best fitted. This of course does not apply to recruits; each of whom must be taught the duties of every member under all circumstances.*

Crews also drilled with "diminished numbers" to prepare for the grim realities of the Civil War battlefield. In fact, Civil War pieces could be served by as few as two men. In such dire circumstances, regulations stated that the gunner "commands, points, serves the vent, and fires;" while the number one man "sponges, loads, and serves ammunition." An account of one battery's experience at the bloody battle of Spotsylvania not only demonstrates the utility of drilling with diminished numbers but also captures the intensity of Civil War combat:

*[Our section commander] gave the command 'Limber the guns, drivers mount, cannoneers mount, caissons rear,' and away we went, up the hill, past our infantry, and into position. . . . We were a considerable distance in front of our infantry, and of course artillery could not live long under such a fire as the enemy were putting through there. Our men went down in short order. The left gun fired 9 rounds, I fired 14 with mine. . . . Our section*

*went into action with 23 men and one officer. The only ones who came out sound were the lieutenant and myself. Every horse was killed, 7 of the men were killed outright, 16 wounded; the gun carriages were so cut with bullets as to be of no further service. . . . 27 balls passed through the lid of the limber chest while number 6 was getting out ammunition. The sponge bucket on my gun had 39 holes in it being perforated like a sieve.*

Obviously, this first of the truly modern wars wreaked bloody havoc with men, animals, and materiel alike.

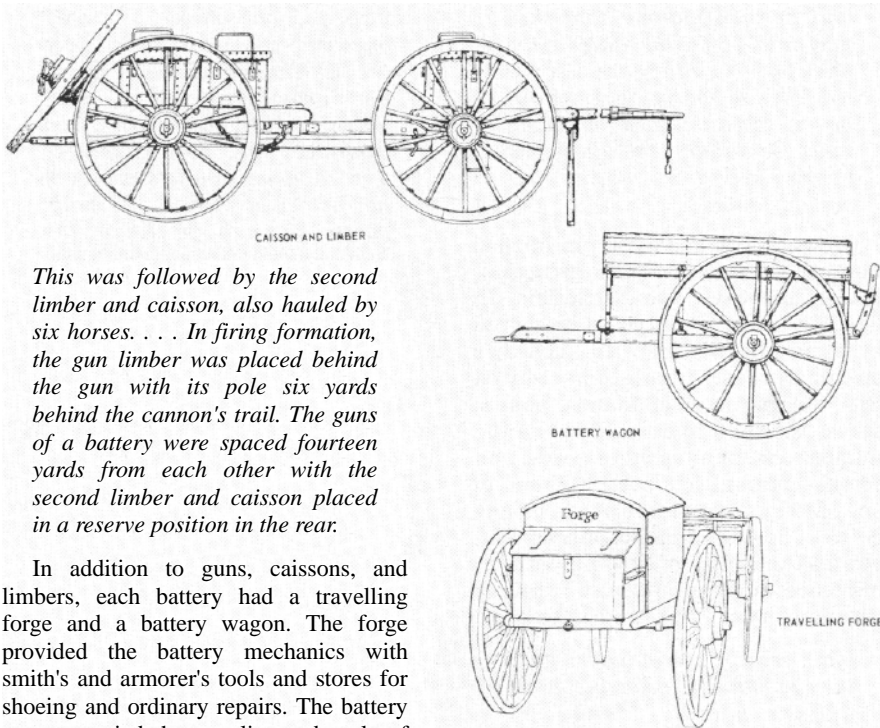
## Equipment for the Civil War Battery

The guns these men served varied greatly in types and caliber. At the beginning of the war, the most common field piece in the light or field artillery was the 12-pounder light gun, or gun-howitzer. Made of bronze, this smooth bore weapon could fire a variety of projectiles to an effective range of 1,500 to 2,000 yards. The 12-pounder remained one of the most common weapons throughout the war, but other pieces, especially rifled guns, soon became popular. The 3-inch ordnance rifle, often called a Rodman gun because it bore a great

resemblance to a large seacoast defense cannon developed by Captain T. J. Rodman, was widely favored by cannoneers. It was light, maneuverable, and accurate out to a range of over 3,500 yards. But its principal virtue was its well-deserved reputation for not blowing up in the cannoneers' faces. Sadly, the same could not be said of another often-used rifled piece—the 10-pounder Parrott. The cast-iron Parrotts frequently exploded, killing and maiming scores of gunners.

Caissons, limbers, and other equipment were necessary to support the Civil War artillery piece in action. One battery history describes these as follows:

*With each gun, the field artillery had two limbers and one caisson. Each limber had an ammunition chest mounted with seats for three of the gun crew, while the caisson carried two additional ammunition chests and a spare wheel. When en route, the gun's trail was hitched to the rear of one limber and the combination was pulled by six horses.*



*This was followed by the second limber and caisson, also hauled by six horses. . . . In firing formation, the gun limber was placed behind the gun with its pole six yards behind the cannon's trail. The guns of a battery were spaced fourteen yards from each other with the second limber and caisson placed in a reserve position in the rear.*

In addition to guns, caissons, and limbers, each battery had a travelling forge and a battery wagon. The forge provided the battery mechanics with smith's and armorer's tools and stores for shoeing and ordinary repairs. The battery wagon carried the supplies and tools of the carriage-maker, wheelwright, and saddle and harness-maker. Therefore, most repairs could be performed by battery personnel during daily operations.

Cannoneers usually carried artillery sabers and revolvers as small arms, but most Redlegs realized then, as they do today, that their best defense was primarily the delivery of timely and

accurate fire support to the infantry and cavalry. Most artillerymen agreed with Lieutenant (later Major General) John Gibbon when he wrote in his text, *The Artillerist's Manual*:

*Artillery cannot defend itself when hard-pressed, and should always be sustained by either infantry or cavalry. The proposition made to arm the cannoneers with small arms such as revolvers and short rifles, is calculated to do more harm than good. They should be taught to look upon their pieces as their proper arm of defense, to be abandoned only at the very last moment. The fate of many a battle has turned upon the delivery of a few rounds of grape or canister at short range upon an advancing column. . . . Let the rifles, therefore, be given to the infantry, and the sabers and revolvers to the cavalry; guard the artillery with these arms, and teach them that their salvation is in sticking to their pieces.*

Artillery ammunition of the Civil War was generally of four types: solid shot, canister, shell, and spherical case shot. Solid shot was a round iron sphere used for battering walls and against tightly packed masses of troops. A canister round consisted of 27 or more 1.5-inch diameter iron balls packed into a tin case which exploded upon firing; it was effective at

close ranges against personnel. The bursting shell was ignited by a time fuze. Its principal uses were to destroy buildings, earthworks, and troops under cover at some distance. The spherical case was similar to the canister but could reach greater ranges.

Cannoneers loaded cumbersome ammunition chests on each limber and caisson according to detailed instructions. In fact, War Department directives specified the proper way of carrying every item of ammunition and equipment required to sustain the piece in action. Every shell, spherical case shot, priming wire, fuze wrench, thumbstall, lanyard and gunner's gimlet had its designated place; and battery leaders expected them to remain there until used and then to be returned promptly.

## Subsistence for the Civil War Battery

Providing clothing and food for their Civil War battery was an important responsibility of the battery leaders. Each artilleryman who entered federal service received an initial clothing issue from his quartermaster. This issue included two caps, one hat, one overcoat, two artillery jackets, three pairs of trousers, three flannel shirts, three pairs of flannel drawers, four pairs of stockings, two pairs of boots, and one blanket. Quartermasters expected most of this issue to last a year but logisticians replaced certified battle losses as required. Other losses were deducted from the soldier's annual pay of 42 dollars. Civil War gunners were notorious for taking poor care of their uniform and clothing items. Loaded down with ammunition and rations, they quickly abandoned extra clothing such as overcoats. The effect of this wastefulness was to overburden the supply system.

The food provided to Union soldiers was as plain and functional as the issue clothing. At the beginning of the war, Army regulations specified that rations consist mainly of a standard, bland "meat and potatoes" diet. Unfortunately, the meat was frequently salted, and the portions were small. As volunteers unaccustomed to a bleak Army diet began to fill the federal ranks, Congress quickly recognized that this fare was barely sufficient. In consequence, the legislators directed that fresh beef or fresh mutton be issued in lieu of salt beef as often as practical. Shortly thereafter, authorities directed quartermasters

to increase the issue of potatoes; and hominy, peas, onions, or canned tomatoes soon appeared on ration lists. Molasses, syrup, and pepper were added in 1863. On the march, soldiers usually received hard bread, salt pork, sugar, coffee, and salt. Although the food was generally sufficient and usually nourishing, poor preparation, and abominable sanitary conditions led to scurvy, dysentery, and other diseases. Sickness and disease, of course, killed many more Civil War Redlegs than battle did.

Battery animals also required daily sustenance, and providing for proper forage for over a hundred hardworking horses was a significant daily activity for the Civil War gunner. Quartermasters responsible for procuring and supplying sufficient forage for all animals were hard-pressed to keep the forage wagons full and operating. Battery personnel spent a large part of their day caring for these animals. In addition to feeding and watering them, they were required to groom and rub them down daily. War Department instructions provided exact step-by-step instructions for tending the horses and mules, and cautioned that:

*It should be carefully impressed upon the men that the horse may be made gentle and obedient by patience, kindness, and fearlessness; that punishment is only to be resorted to when it cannot be avoided and then only administered immediately after the commission of the offense. . . . Nothing should ever be done to the horse in anger. Restlessness and impatience frequently arise from exuberance of spirits or playfulness. When restless, the horse should be held until he becomes calm; when submissive after punishment, he should be treated kindly. The cannoneers should endeavor to inspire him with confidence. . . .*

This advice could apply equally as well to the management of soldiers.

## Lessons from the Past

Relatively simple, highly functional equipment and supplies proved the keys to effective combat service support for the Civil War field artillery battery. Although this article's subject matter may appear quaint and antiquated by today's standards, this glimpse of the daily support required by the Redlegs of that bygone era does underscore a number of lessons which remain valid even in modern armies.



**The different military wagons transported men, equipment, and supplies across the Civil War battlefields.**


- Soldiers must learn the proper care and maintenance of battery transport and equipment.
- More significantly, leaders must ensure by their own vigilance that exacting maintenance standards are met.
- Leaders must demonstrate their care for the men by training them hard. Civil War cannoneers drilled, sweated, and drilled some more until their actions became almost automatic.
- Leaders must never undervalue the critical role that logistics plays at all levels of war.

Civil War leaders learned, as we know today, that attention to detail and discipline not only build combat ready units, but are, in fact, the keys to battlefield survival and ultimate victory.

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Civil War gunners serve as voices from the past echoing what Redlegs have relearned time and time again about building and supporting effective units. As lessons, they are timeless. Indeed, Lieutenant Gibbon's advice to the cannoneer of 1861 is hard to improve upon:

*It is of the first importance that the fire of a battery be delivered at a good range with calmness and intelligence. . . . The principal object of artillery is to sustain the troops in attack and defense; to facilitate their movements and oppose the enemy's; to destroy his forces as well as the obstacles which protect them; and to keep up the combat until an opportunity is offered for a decisive blow.*

Such advice requires no translation for today's Redlegs who know and value the tradition of operational and logistical excellence which still animates the Corps of Artillery. 

# Where is the Ammo?

by Major Beverly Brown and Captain Kevin Zealberg



**C**lass V resupply is the Achilles heel of the field artillery. Study after study and exercise after exercise have underscored this simple truth. But what's being done about this thorny issue? How is the King of Battle dealing with the often asked question, "Where's the ammo?"

The ability of the field artillery to provide fire support for maneuver forces is directly related to our understanding and execution of resupply operations. In order to perform their roles as fire support coordinators, today's artillery leaders must have a thorough knowledge of the logistics system and how ammunition will be resupplied.

They must then apply that knowledge to solve the following specific problem: A direct support artillery battalion in a high-intensity, European scenario will need a resupply of 600 short tons of ammunition per day. Our current ammunition resupply system can provide only 350 short tons daily through ammunition transfer points. Thus a battalion commander could anticipate that his organization would have to draw 250 short tons from the corps ammunition supply point to make up for this shortfall. In fact, experience suggests that most battalions simply do not have the trucks and manpower needed to move such massive loads the extreme distances

between corps ammunition supply points and shifting battery positions.

## Current Ammunition Doctrine

A quick overview of our current ammunition resupply system shows the complexities involved in finding solutions to our current ammunition resupply problems. There are three key players involved in ammunition resupply: the field artillery, the ordnance corps, and the transportation corps. Each player has parochial perspectives and philosophies that are often at odds.

Today's field artillery doctrine for ammunition resupply is actually quite simple. The battery executive officer or firing platoon leader in a direct support battalion sends ammunition expenditure reports to his battalion tactical operations center. The battalion S3 monitors these reports; and with guidance from the battalion commander, brigade fire support officer, and division artillery S3, he tabulates anticipated requirements and instructs the battalion ammunition officer to fill out a DA Form 581, *Request for Issue and Turn-In of Ammunition*. The battalion ammunition officer then rounds up empty 10-ton heavy expanded mobility tactical truck (HEMTT) ammunition vehicles and drives off in convoy to the brigade ammunition transfer point located somewhere close to the brigade support area, some 10 to 20 kilometers to the rear. There the division ammunition officer's representative authenticates the DA Form 581 and issues the battalion ammunition officer the ammunition that is available. If he cannot completely fill the request at the ammunition transfer point (ATP), the ammunition officer must decide whether to drive another 20 to 30 kilometers to the corps ammunition supply point in the division rear. Even barring complications, the entire process can take 5 to 10 hours per round trip. In addition to time on the road, the convoy may languish in lines of up to 200 trucks at the transfer point and 600 trucks at the supply point. What's more, drivers can draw only a single type load depending on what is on-hand at both locations.

While all this is taking place, our combat service support counterparts are working to ensure class V is adequately stocked at the transfer and supply points. The corps materiel management center (CMMC), a combat service support organization, has the responsibility for controlling and allocating ammunition. Operating under the corps commander's guidance, ordnance corps personnel control the flow of ammunition at the corps storage area (CSA) and ammunition supply points. Each corps has two ammunition companies assigned to perform these duties.

Contemporary ammunition supply and transfer points are large and slow to establish. Both are very vulnerable because of the large amounts of ammunition downloaded on the ground and the signature resulting from numerous vehicles moving into and out of the area.

The corps movement control center (CMCC) is a transportation corps unit which has the responsibility of allocating the corps transportation assets. The movement control center allocates the vehicles to move ammunition over the battlefield to supply and transfer points. Furthermore, its leaders must establish priorities for transporting all classes of supply based on the corps commander's guidance.

The CMMC and CMCC work together to accomplish the task of moving not only ammunition from the corps storage area to supply and transfer points, but also all the other classes of supply from the corps storage area to user units. Of course, class V usually has priority over the other classes. Still it must compete with them for movement on the limited number of available trucks travelling over a limited road network.

Most field artillerymen view the corps storage areas and ammunition supply and transfer points simply as sites where ammunition supplies are stocked. The enormity of establishing and maintaining these points often escapes them. But to be an effective team, each branch must eschew parochialism. It is incumbent upon all involved organizations to ensure the right types of ammunition arrive at the right place and time on the battlefield. What they need is a system that makes more efficient use of the resources available to supply units with class V.

## Bulk-Killer Forward

One particularly promising new concept being developed at the Field Artillery School is known as "Bulk-Killer Forward." The key elements of this approach include:

- The streamlined delivery of bulk-killer ammunition.
- Ammunition configured in complete round loads.
- Bulk delivery to battalion trains.
- A predictive push system adjusted by combat consumption.
- Field artillery units drawing low usage munitions from the ammunition supply point.

Under the bulk-killer concept ammunition falls into two classes—"bulk-killers" and "low usage." Based upon their lethality during each operation, commanders will select bulk-killer munitions within a particular theater. Ordnance personnel will push forward at a predicted rate all the required components—projectile, fuze, powder, and primer—of the selected munition to the appropriate caliber field artillery battalions. When the first bulk-killer is used up, ordnance personnel will push forward the next best bulk-killer. The most likely candidates for bulk-killer munitions are dual-purpose improved conventional munitions and high

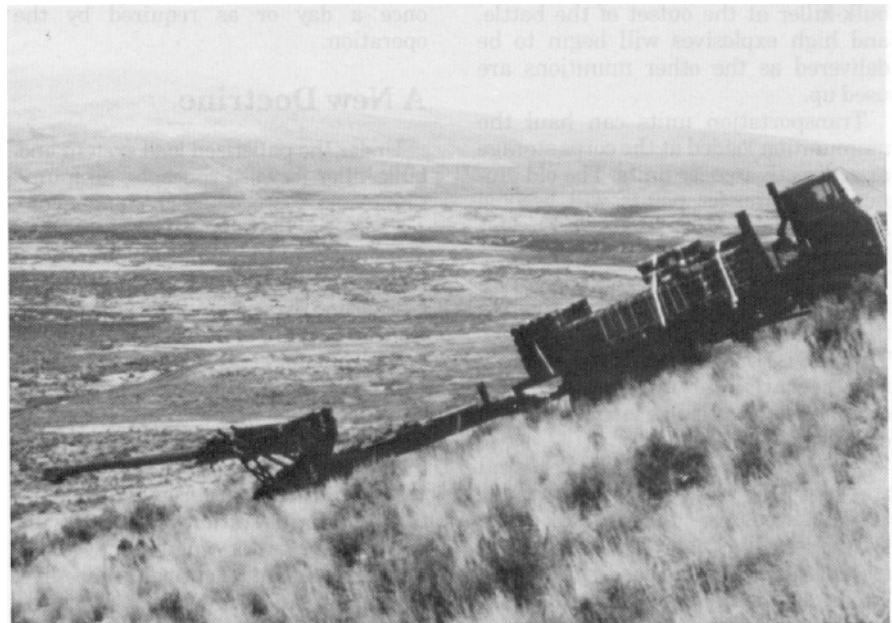
explosive rounds. Low usage munitions are those lethal and nonlethal rounds not available or required in large quantities—smart munitions, field artillery delivered mines, and smoke and illumination rounds. Low usage munitions will be stored at ammunition supply points in the division rear area for pick-up by field artillery battalions as required.

## Palletized Load System

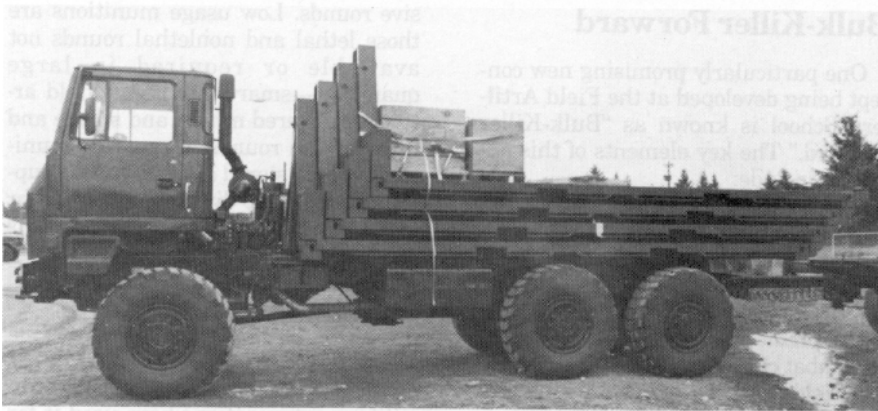
The palletized load system (PLS) is not a new item. Commercial and even military organizations have used it for years. But for the US Army it represents a new capability. The components of the field artillery's palletized load system are a 15-ton truck, 15-ton trailer, flatracks, and preconfigured unit loads.

The PLS truck and trailer carry a total of 30 tons of class V. The PLS truck has a loading arm capable of transloading a complete package of preconfigured flatracks in under 5 minutes. This remarkable ability takes a heavy burden off the 13B cannoneers and 55B ammunition specialists who have had to perform such operations by hand since World War I.

The palletized load system and the bulk-killer forward concepts will have little effect on our doctrine for the operation



The palletized load system in action with the 9th Infantry Division Artillery.



**The palletized load system truck and trailer has a loading arm capable of transloading a complete package of preconfigured flatracks in under 5 minutes.**

of theater storage areas and ammunition supply points. Their real impact will be at the corps storage areas and the ammunition transfer points. The corps storage area will become the focal point for ammunition resupply. Ordnance personnel at the storage area will configure ammunition loads on the palletized load system flatracks for user units. They will position projectiles, propellant charges, fuzes, and primers on the flatracks for delivery to field artillery battalion trains. The corps storage area will serve as a funnel for high volume, bulk-killer munition. Dual-purpose improved conventional munitions will more than likely be the bulk-killer at the outset of the battle, and high explosives will begin to be delivered as the other munitions are used up.

Transportation units can haul the ammunition loaded at the corps storage area directly to user units. The old ammunition transfer points will become ammunition control points located at the rear of maneuver brigade sectors. Escorts will meet trucks arriving from the corps storage area and lead them to the field artillery battalion trains. The division ammunition officer's representative at the ammunition control point will supervise the overall operation.

At the battalion trains, Redlegs and transporters will work together to transload the preconfigured bulk-killer flatracks to battalion trucks and put empty flatracks on the corps trucks. The hydraulic loading arms on the PLS truck should make this a 10 to 15 minute operation. The newly replenished battalion ammunition PLS trucks will

then move to the firing battery trains to resupply the field artillery ammunition support vehicle. The corps trucks will return to the corps storage area with the empty flatracks to begin the process again.

The ammunition supply points in the division rear areas provide storage sites for an emergency resupply of dual-purpose improved conventional munitions and a holding area for the low-volume munitions—smoke, illumination, family of scatterable mines, and Copperhead—used by the field artillery battalions. Unit convoys will draw the necessary numbers of low-usage rounds once a day or as required by the operation.

## **A New Doctrine**

Under the palletized load system and bulk-killer forward concepts, ammunition resupply procedures no longer consist of the battalion S3 telling the ammunition officer to fill out a DA Form 581, round up the ammunition trucks, and drive off to the ammunition transfer point to secure available munitions. The new class V resupply system will be driven by the prediction of ammunition usage based on user expenditure reports and guidance from the theater, corps, and division staffs.

Field artillery batteries will use either the administration and logistics radio net or the battery computer system's battalion ammunition update message to send periodic ammunition usage reports to their battalion tactical operations centers. The battalion S3 and S4 will

consolidate these reports and forward the battalion's ammunition status to the division artillery via the tactical operations center tactical fire direction system (TACFIRE). This should enable the division artillery S3 and S4 to monitor the ammunition expenditure and request resupplies of the bulk-killer munitions. Upon receiving such a request, the division ammunition officer will forward it to the corps support command for delivery of the munitions from the corps storage area. Adhering to this procedure should allow units to rearm as they consume their munitions.

In addition to this process, the division artillery S3 and S4, the division ammunition officer, and corps support command will receive guidance from their respective commanders and staffs based on the tactical situation and projected class V usage rates of units. The tactical guidance and usage reports will provide valuable information to the key players involved in the ammunition resupply process. With that information in mind, they will be able to modify resupply rates to meet established priorities.

Of course, field artillery battalions will still have access to critical ammunition through the ammunition supply point in the division's rear area. There the division ammunition officer will position a 1-day emergency resupply of high volume bulk-killer munitions as well as the low-usage munitions. The field artillery battalion S3 and S4 will ensure their unit draws low-usage munitions daily or as required by the operation.

This situation provides a challenge to the battalion ammunition officer. He must ensure that enough empty palletized load system trucks are available for incoming bulk-killer munitions from the corps storage area, while retaining sufficient ammunition trucks to draw low-usage ammunition from the ammunition supply points. Under exceptional conditions, he may, of course, place flatracks on the ground for short periods of time until organic transport becomes available.

The palletized load system and bulk-killer forward concept will also apply to corps field artillery brigades. All the procedures and responsibilities for reporting ammunition usage and predicting ammunition will be much the same



as for divisional units. The only change is that the field artillery brigade S4 will deal with the division ammunition officer after the S3 and S4 have consolidated all of the usage reports from the battalions within the brigade.

## Conclusion

Concepts like the palletized load system and bulk-killer forward have tremendous promise. But to make them work field artillerymen must break away from their normal training methods. Redlegs must make ammunition resupply training realistic. They can no longer operate under the notion that ammunition will magically appear at the battalion trains.

Artillery leaders at every echelon must take an active interest in the ammunition resupply to ensure they can meet the gargantuan demands of the fire support system. To make the bulk-killer forward system work, we must use National Training Center rotations as well as command post and field training exercises as opportunities to develop ammunition resupply capabilities. Such training should not allow shortcuts; serious artillery leaders must simply bite the bullet and force the system to work.



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# Logistics on the Way

by Captain Terry Shaw

## Multi-Option Fuze Artillery

**S**implicity is not only a principle of war but also a tenet of logistics. The field artillery is applying that tenet in an exciting new ammunition program known as the multioption fuze artillery (MOFA). The final product of the MOFA initiative will be usable on 105-mm, 155-mm, and 8-inch bursting type artillery projectiles.

The field artillery currently has 12 different fuzes for bursting projectiles. This proliferation results in time consuming delays and the maintenance of large inventories. In fact, field artillery sections must now carry an overage of fuzes to achieve any flexibility. MOFA will largely eliminate such inefficiencies by serving as a point detonating, proximity, and time fuze all in one.

The ammunition resupply scheme will provide one MOFA per burster projectile. Self-propelled and towed cannon crews will mate MOFA to the projectiles and store the ready-to-use round until firing.

The MOFA initiative is awaiting US Army Training and Doctrine Command approval and may be ready for testing by 1989. Fielding for the MOFA could take place as early as 1992.



## Ammunition Packaging

**A**s every gunner knows, ammunition handling can be a time-consuming, fatiguing chore. The Army's leadership understands this problem and is doing something about it. Specifically, the Logistics Community has launched an innovative program known as the Ammunition Packaging Improvement Requirement. The heart of this project is a new ammunition pallet which

holds 10 projectiles horizontally. Unlike the current 8-round wooden pallet, the new gear allows crewmen to remove one or more projectiles without destroying the package's structural integrity.

The ammunition packaging improvements also include provisions for overhead hoisting and the capability to fuze the rounds in the pallet. What's more, the pallet protects the rotating bands eliminating the need for grommets.

Other notable advantages of the pallet include:

- Compatibility with all current and projected material handling equipment.
- Versatility in accommodating all present 155-mm ammunition as well as all the new projectiles except for the nuclear, binary, chemical, and Copperhead rounds.
- Convenience of the identification markings on each projectile container and from its ease of decontamination by personnel in mission-oriented protection posture IV or cold weather gear.

To complement the pallet, the Defense Ammunition Center developed a new system called the six-leg sling. The sling facilitates the rapid distribution of a unit's ammunition by doubling the load-bearing capacity. Specifically, the six-leg sling used with the crane on the Army's new M-977 heavy expanded mobility tactical truck can lift two or three pallets of 155-mm or 8-inch projectiles at one time. Time studies held in November 1984 at Fort Lewis, Washington, evaluated loading and unloading complete rounds when using the sling. The results of the study indicated a significantly quicker ammunition upload at the ammunition supply point.



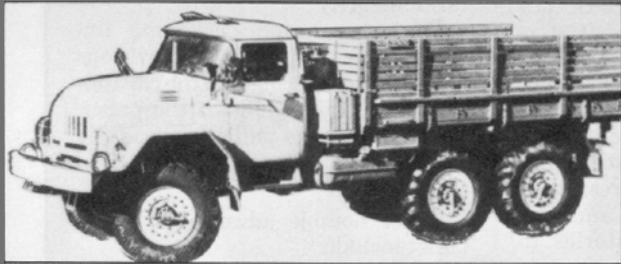
# Bite the Bullet:

## Looking at Red CSS

by Captain George T. Norris



URAL-375D



ZIL-131



URAL-4320



GAZ-66

Virtually every field artilleryman has squirmed through at least one of those uncomfortable "Threat" briefings which paints a picture of unrelenting gloom and doom. The ardent briefer never seems to tire of frightful predictions about the number of tubes the Soviets can mass and the overpowering number of rounds they will fire. The inevitable reaction of dismay often gives way to a cautious skepticism. Surely the Soviets couldn't really *supply* that much ammunition in combat. After all, American units can't—and they're good.

Such rationalizations are natural. They result from an attempt to liken the Soviet system to our own. But the American artilleryman cannot afford to underestimate the Soviet system of combat service support (CSS). As with most other aspects of the Soviet military, there aren't many similarities between the ways the Soviets and the Americans do the business of logistics. An objective examination of Soviet logistics principles, procedures, organizations, and equipment reveals that they *can* actually meet their horrendous ammunition supply requirements and that American field artillerymen need to find a way to deal with that Red CSS capability.

### Soviet Ammunition Supply

Just as they do in every other facet of life, the Soviets place one man in charge of logistics. They achieve unity of effort by giving a single officer at each echelon the responsibility for all logistical matters. Certainly, his job is simplified by a number of means—standardized supply priorities, precalculated resupply norms, and automation. For example, in almost every tactical situation, the Soviet logistician can assume that ammunition is the first priority for resupply. But controlling the mammoth resupply effort remains a complex, difficult task.

Every Soviet leader knows exactly who's responsible for handling ammunition requirements—the chief of rocket troops and artillery (CRTA). Unlike American artillery commanders who focus strictly on their units' resupply, the CRTA is responsible for coordinating the resupply of *all* ammunition types. His staff determines and provides the requirements for artillery, infantry, and tank ammunition to the chief of rear services and then monitors the ammunition stockage levels in each unit.

Like his US counterpart, the CRTA talks in terms of "basic load," but unlike an American gunner he does not expect his units to carry all of it. Some of the

basic load will be in depots and will require transport if it is to be fired. The CRTA will define the basic load after analyzing the units' mission, the character of the enemy, and the results of combat modeling exercises. He will express the load in terms of multiples of a "unit of fire." Not to be confused with the US controlled supply rate, the Soviet unit of fire is simply a number of rounds for a particular weapon system. Based upon historically validated planning norms, the CRTA will decide how many units of fire each unit should carry. This provides a starting point from which he can track ammunition expenditures, determine ammunition resupply requirements, and also plan fires.

Ammunition production and delivery procedures also vary between the Soviet and US systems. The Soviets have been stockpiling ammunition in Europe for decades. Their much heralded shortages of the early 1970s have given way to stocks sufficient for 60 to 90 days of combat. With that much ammunition in theater, the Soviets confront a problem of tactical *transport*, not one of operational or strategic resupply.

But with their usual aplomb, the Soviets are dealing rapidly with the transport problem. Once again relying on the principle of unity of effort, the Soviets give one officer—the chief of rear services—the authority to commandeer every truck in the army to transport ammunition. Although an unlikely event, this potential underscores the fact that with sufficient transportation resources, the Soviets can move tons of ammunition in short order. Furthermore, unlike the US approach of establishing several ammunition supply and transfer points, the CRTA and the chief of rear services can order the bypassing of intervening echelons and the direct delivery from the depot to the user. In doing so, they experience few problems with property accountability. Drivers of trucks simply trade vehicles. The resupplied units get a full vehicle and the resupply driver gets the empty one. This elimination of transloading avoids the need for many Western innovations like palletized load systems or large quantities of rough terrain forklifts.

The future doesn't look bad for the Soviets either. Estimates suggest that they are continuing their efforts to eliminate any vestiges of what Western analysts have incorrectly termed the "Achilles' heel" of resupply. At division level, they have achieved a 30 percent increase in the number of trucks by consolidating transport units. What's more, they have fielded newer, more reliable vehicles. Western armies are now taking great pride in producing trucks with a central tire inflation system to improve their off-road mobility. Ironically, the Soviets have had that capability on almost every wheeled vehicle for years. What's more at army and *front* levels, materiel transport brigades are now available to streamline the movement of supplies which include increased lethality munitions.




**A Soviet field artilleryman loads ammunition into a 2S1 howitzer.**

The prospects for the Soviet commander continue to improve. Even his ability to command and control will change for the better with the fielding of new computer systems which will make it easier to account for ammunition.

### **A Warning for Redlegs**

Like all those other grim "Threat" briefings, this article conveys a strong warning for Redlegs. But there is a ray of hope—good targeting. Perhaps the most important thing to remember is that the key to defeating Soviet formations is attacking the *right* target, not every target. Like everything else in the Soviet system, logistics is tightly controlled from the top. With centralized control, more efficient use and allocation of limited resources are possible. By adopting this approach, the Soviets have actually pointed out the "right" target for us—the officer who controls the efforts. Destruction of the CRTA's command battery, for example, would not only eliminate the officer coordinating the artillery fires, but also the one controlling ammunition resupply.

When combined with the use of prudent survivability measures, and a well-thought-out operations security program, this targeting approach could throw a wrench in the best Soviet plans. Solutions are available, and they are by far preferable to the misguided rationalizations which question the Soviet's capabilities. American Redlegs must understand every facet of logistics from both the US and Soviet perspectives if they expect to win in combat. Hope springs eternal in the heart of the fool who wishes away the enemy's capabilities. But hopes can become realities if bright Redleg minds grapple with true dimensions of the problem at hand. 

**Captain George T. Norris, FA, is a threat and military intelligence instructor in the Tactics and Combined Arms Department at the US Army Field Artillery School at Fort Sill, Oklahoma. He received his commission through the United States Military Academy. Captain Norris' field artillery assignments include battery commander, warhead detachment commander, and brigade operations and intelligence officer.**

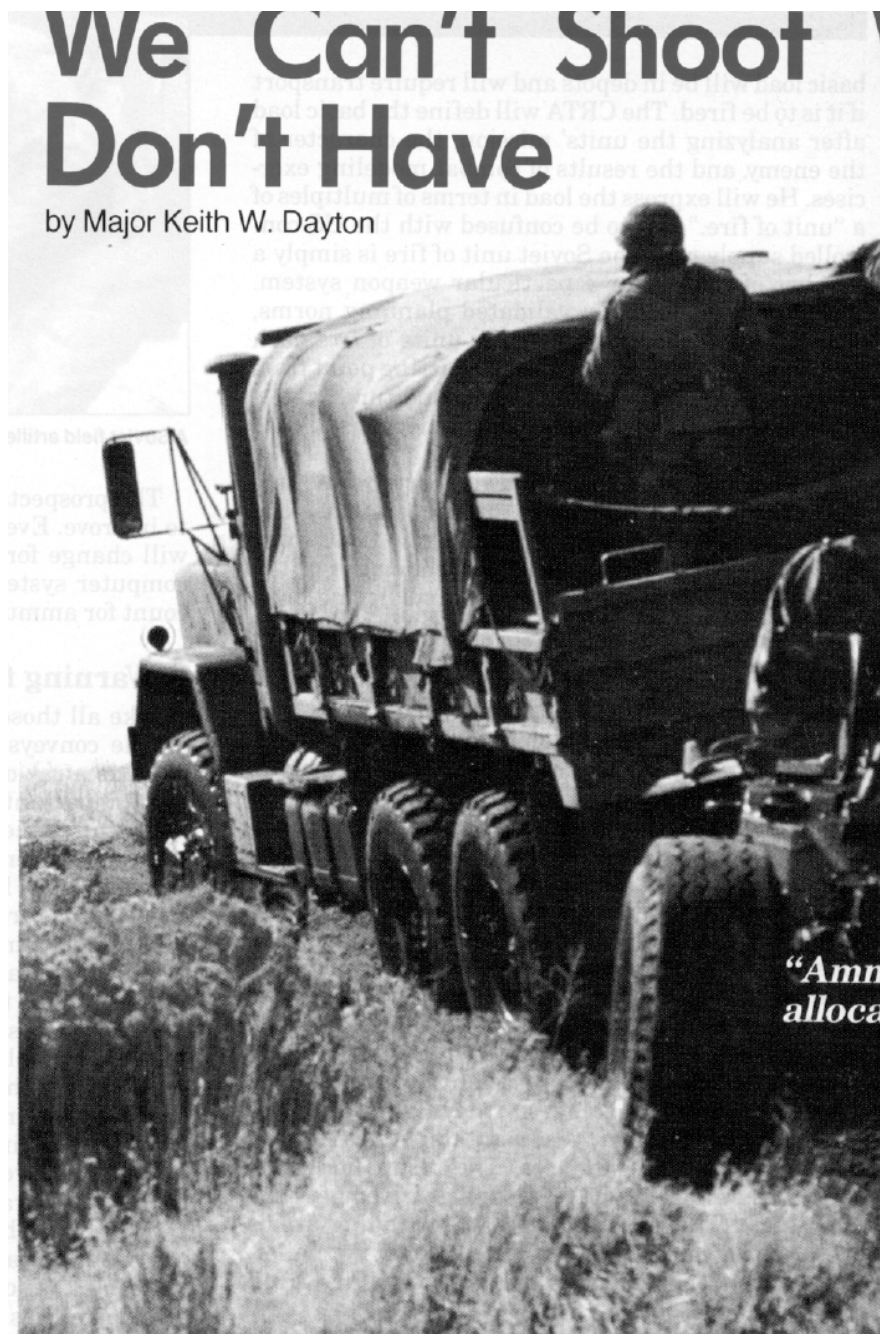
With the continuing turbulence in the Middle East, American forces may someday have to deploy to Southwest Asia to fight a sophisticated, well-equipped enemy. Combat there could involve operations which range over great distances and extended frontages. Divisional units would undoubtedly fight widely separated actions, and the difficult terrain and weather would present gargantuan challenges.

The primitive road network would certainly encumber logistical operations. Without host nation support, the first division to reach the theater would have to rely predominantly on its assets to haul needed supplies. FM 100-5, *Operations*, provides doctrine on how to fight, but precious little information informs divisional leaders on how to sustain field artillery units in an austere, hostile environment.

The 3d Battalion, 34th Field Artillery—a 155-mm M198 battalion stationed at Fort Lewis, Washington—simulated a contingency mission in Southwest Asia during Caber Toss, a division-level logistics field training exercise. Standard organizations and established procedures came under careful scrutiny, and experts evaluated resupply concepts and a formal support battalion system. In the process, the battalion's leaders learned how best to sustain the organization with ammunition over a period of several days of simulated combat in desert and mountainous terrain. Perhaps the lessons learned during this exercise will be valuable to Redlegs concerned about field ammunition resupply.

## Scenario

Organized under a test table of organization and equipment, the 3-34th was a prototype direct support field artillery battalion for a motorized division. The battalion had three firing batteries of six M198 155-mm howitzers each, as well as a headquarters and headquarters battery and a service battery. Because of strategic aircraft sortie constraints, the battalion's ammunition hauling capabilities were lean. The unit had a total of 30 5-ton trucks with ammunition trailers—6 per firing battery and 12 in the battalion ammunition section in the service battery. The exercise scenario involved no host nation support, and the corps-level assets available



to assist in divisional logistics play were very limited.

Throughout the exercise, the firing batteries occupied positions approximately 5 kilometers from headquarters and headquarters battery and 10 to 20 kilometers forward of the service battery. On several occasions, the service battery was as far as 40 kilometers from the firing positions. Ammunition flowed from a corps ammunition supply point to an ammunition transfer point in the brigade zone about 35 to 45 kilometers from the batteries.

The exercise involved the physical handling of realistic quantities of ammunition including 3,000 inert 155-mm rounds plus 10,000 empty 105-mm ammunition boxes which the participants configured to simulate loads of complete rounds. Because of the inadequate roads at Yakima Firing Center and peacetime readiness concerns, the battalion did not carry a 100 percent "combat" overload on its trucks and trailers. As a result, an ammunition 5-ton and its trailer transported 72 complete rounds; and each howitzer prime mover carried



**resupply is the most critical problem faced by a commander.”**

Lieutenant General Robert W. RisCassi,  
Deputy Commanding General,  
US Army Training and Doctrine Command

54 rounds. Surrogates for the high-mobility material handling equipment—a light combination forklift and crane being tested at Fort Lewis—operated at the ammunition transfer point and at the firing batteries. They facilitated transloading of ammunition from incoming vehicles either to ground storage areas or to howitzer prime movers. The forklift and crane worked well, but the surrogates lacked the speed and mobility to keep up with the rest of the battery during movements.

March-April 1986

## Predictive Ammunition Model

Using a model developed by the Army Missile and Munitions Center and School, the soldiers in the division ammunition office programed and pushed ammunition from the ammunition supply point to the ammunition transfer point. The division ammunition officer employed off-the-shelf computers, software, and a communications "bit box" to communicate with the division artillery's main tactical fire direction system (TACFIRE) computer. The software contained a predictive algorithm, which sampled the TACFIRE data base every 12 hours and sought to resupply battalion ammunition stocks in preconfigured battery packages based on anticipated and actual expenditure rates. The goal was to keep the battalion stocked with a predetermined operational load sufficient to support maneuver operations.

One major problem surfaced with the model: Based on the assumption that what a unit started with would be what the unit needed in the future, the predictive algorithm attempted to replace expended ammunition with like ammunition types. For example, if a unit fired dual-purpose improved conventional munitions at a target because it lacked Copperhead, the

system would resupply dual-purpose improved conventional munitions. Of course, the model can be fixed. And all things considered, the idea of a push system of ammunition in preconfigured battery packages showed great promise.

## Ammunition Transfer Point

The 3d Forward Support Battalion of the division's support command set up ammunition transfer points in a brigade support area. During Caber Toss, two noncommissioned officers from the forward support battalion controlled the ammunition transfer point and supervised the operation of seven surrogate high-mobility material handling equipment vehicles. The division ammunition office scheduled ammunition convoy arrivals at the ammunition transfer point at 1-hour intervals. This allowed the battalion to resupply twice daily. Night operations continued under full blackout conditions with the drivers using night-vision goggles. Responding to some initial confusion, the battalion commander positioned his ammunition officer at the ammunition transfer point. From then on the transloading operation went more smoothly. The battalion ammunition officer ensured the



**The high-mobility material handling equipment vehicles allow the battalion to resupply twice daily.**



**Frequent movement across difficult terrain often prevents corps throughput.**

proper loading of ammunition convoys, coordinated with other units in the brigade support area for maintenance and logistic assistance, and saw that ammunition convoys left promptly for the correct firing batteries.

There were, of course, some problems. Ideally, the stake and platform tractor trailers hauling ammunition from the corps ammunition supply point would arrive at the ammunition transfer point at the same time as the battalions convoys; but in reality this did not always happen. Moreover, when the brigade support area relocated, scheduled ammunition pickups were sometimes missed because operators at the ammunition transfer points required

considerable time to reestablish operations.

## **Service Battery**

The battalion commander considered positioning the service battery in the brigade support area along with maneuver battalion trains. He reasoned that this scheme would provide additional security for the battery and colocated it with the sources of supply and maintenance. But he eventually elected to position it nearer to the firing batteries—about one-third of the distance between the firing batteries and the brigade support area. This arrangement had several advantages.

- Evacuation distances for personnel and equipment to the battalion collection point were kept at a reasonable minimum.
- The service battery could displace frequently to keep up with the tactical situation and provide more timely field artillery related support.
- The battery could function as an intermediate way station to rest and feed personnel and to repair ammunition vehicles between the firing batteries and the ammunition transfer points.
- The arrangement also eased FM communications among the battalion ammunition officer at the ammunition transfer point, commanders in transit, the service battery movement control center, and the operations and intelligence officers in the tactical operations center.

The battalion commander consolidated control of all ammunition trucks within the battalion under the service battery commander. He reached this decision based on the volume and variable types of ammunition to be moved, the distances involved, the pressing command and control challenges, driver abilities, and the need to divert ammunition convoys to changing battery locations.

The service battery commander divided his pool of 30 trucks into three 10-truck sections, and he dedicated a section to resupply each firing battery. This arrangement gave the battalion the capability to move 720 complete rounds per convoy. That meant 120 rounds per tube would reach each firing battery on every trip. Although this approach worked well, it did not address chemical or nuclear loads and left the firing battery commander with no ammunition trucks in the firing positions.

One of the principal reasons why this system worked was the service battery commander's assumption of the full-time role of ammunition movement monitor. In fact, he set up a movement control center

in his tactical operations center and kept in touch with ammunition convoys, the ammunition transfer point, and the battalion tactical operations center using secure AM and FM voice channels. He also used a TACFIRE variable format message entry device to gain access to the battalion command and fire digital net.

The service battery commander planned and monitored all ammunition convoy movements. Specifically, he sent convoys to the ammunition transfer point, monitored their progress, and kept his convoy commanders abreast of the tactical situation and changes in firing battery locations. He also coordinated rest and maintenance periods for the convoys in the service battery area. When a convoy commander lost contact with the control center, he checked in with the battalion ammunition officer at the ammunition transfer point. Although the service battery commander managed the ammunition operation well, he was so overwhelmed by conventional ammunition duties that his battery command, S4, and nuclear duties suffered.

## **Firing Batteries**

During Caber Toss, the major concerns of the firing battery commanders centered on the absence of their assigned ammunition trucks and the lack of speed and mobility of the high-mobility material handling equipment vehicles. The lack of battery ammunition trucks proved particularly problematic during displacements. Because the battery had no on-site ammunition trucks, most incoming rounds were downloaded to the ground and distributed piecemeal to the howitzers as needed. When ordered to displace, battery personnel loaded all the rounds they could on prime movers and left the remainder stockpiled for later pickup. If the battery had to displace hastily, crews simply abandoned stocks on the ground; howitzer prime movers departed with what they had on board at the moment.

The lack of battery ammunition trucks degraded the combat effectiveness of the firing battery and, in the long run, placed a tremendous burden on the supply system. In the heat of a highly-mobile battlefield, attempts to retrieve ammunition left behind would be difficult if not impossible. The battalion's leaders did consider putting more than the rated 54 rounds on the gun trucks and pressing into service the battery maintenance and supply trucks to move ammunition. However, the typical load of basic issue



**9th Infantry Division soldiers occupy a firing position during exercise Caber Toss.**

items completely filled the trucks. Use of the maintenance and supply trucks, although feasible in an extreme emergency, would result in the loss of their cargo. What's more, there would be little time in an emergency situation to load these trucks with ammunition.

### **Controlled Supply Rate**

Caber Toss demonstrated that the "commonly proposed" expenditure rate of 300 rounds per tube per day in a Southwest Asia scenario may be impossible to sustain. The battalion was simply unable to haul that much ammunition over extended, realistic distances. Although limited corps assets were able to push the required number of rounds to an ammunition transfer point in the brigade trains area, a bottleneck arose during movement of ammunition from the transfer point to the firing batteries. With the ammunition transfer point routinely at a distance of 40 kilometers from the firing batteries, the average turnaround time for an ammunition convoy was approximately 8 hours:

- 3 hours to get to the ammunition transfer point from the firing battery.
- 1 to 2 hours to transload at the ammunition transfer point.
- 3 hours to return to the firing battery.
- 1 hour to unload at the firing battery.

With 30 conventional ammunition trucks constantly on the road, minimal crew rest, and a 100 percent operational reliability, the battalion was able to move a maximum of 240 rounds per tube per day. A more realistic operational reliability rate of 90 percent would

translate to deliveries of 220 rounds per tubes per day. If chemical and nuclear prescribed loads had to be carried, the number of rounds carried would fall even further. What's more, by the third day of the exercise, crew rest and maintenance became significant problems, and two round-trips per day had to be adjusted to three round-trips every 48 hours.

### **Corps Throughput**

When it became apparent that a controlled supply rate of 240 rounds placed too much stress on the battalion, the battalion commander attempted to use direct throughput from the ammunition supply point to the firing battery level. When battalion-wide ammunition stores fell below 1,300 rounds, he called for resupply by CH-47 helicopter and corps stake and platform tractor trailers. The results were discouraging. The CH-47s were supporting numerous units and would carry only 40 rounds per lift. Poor roads and difficult terrain so hampered the stake and platform tractor trailers that they often were unsuccessful in reaching firing battery positions.

### **Nuclear and Chemical Munitions**

Although Caber Toss did not involve nuclear and chemical play, the battalion's leaders gave considerable thought to planning for such support. Had the exercise involved these special munitions, they would have had a significant impact on the ammunition test and the battalion's capabilities. Not only would leaders have had to divert scarce ammunition trucks to a distant special ammunition supply point

to pick up the nuclear or chemical rounds, they would also have had to detail a service battery officer to function as a courier officer. Moreover, key battalion ammunition noncommissioned officers, trained to function as nuclear couriers, would have been lost to the conventional resupply effort.

### **Lessons Learned**

Caber Toss taught the 3-34th many valuable lessons about ammunition resupply. Here are but a few.

- A computerized system which "pushes" ammunition to the ammunition transfer point in a brigade support area has promise and should be developed.
- Preconfigured battery ammunition packages are workable and save time in the transloading at the ammunition transfer point.
- A high-mobility material handling equipment vehicle is essential at both the ammunition transfer point and the firing battery, but it must have the same speed and mobility as that of the supported unit.
- The service battery must establish an ammunition movement control center, and the service battery commander must run it.
- FM radios are needed in all ammunition convoys.
- While running the movement control center, the service battery commander's ability to command his unit or act as a nuclear weapons courier is severely limited.
- The battalion ammunition officer needs to supervise operations at the

ammunition transfer point, even though this removes him from nuclear and other battery duties.

- There is a need for a separate S4 officer in the service battery to fill the logistical staff planning gaps mentioned above.

- A corps bulk ammunition push concept is risky and unreliable.

- The service battery needs to be located between the battalion and the brigade support area, not in the brigade support area itself.

- Nuclear and chemical munitions present great challenges in both command and control and haul capability; these munitions need to be factored into future evaluations.

- In an undeveloped theater, the artillery battalion must plan to haul all ammunition from the ammunition transfer point to the guns without external assistance.

- Firing batteries need to retain organic ammunition trucks.

- Howitzer prime movers and firing


battery supply and maintenance vehicles may be devoted to ammunition haul but only in extreme circumstances.

- The whole relationship between the controlled supply rate and the battalion's organic ammunition haul capability in an undeveloped theater needs to be reexamined.

### Conclusion

In the final analysis, Caber Toss suggested that an artillery battalion in combat in Southwest Asia will need more trucks to haul ammunition. Otherwise, the battalion will be unable to deliver fires at anticipated levels. A resupply rate of 240 conventional rounds per tube per day cost the battalion dearly. The 3-34th had to strip all ammunition haul assets from the firing batteries, which, in consequence, were unable to transport on-hand ammunition when they displaced.

The 12 5-ton trucks authorized in the battalion ammunition section with the test table of organization and equipment could realistically resupply approximately 90

rounds per tube per day in a strictly conventional environment. In a motorized division, constrained as it is by strategic aircraft sorties, the addition of more battalion ammunition haul vehicles is clearly not an attractive proposal, but the guns cannot shoot what they don't have. Therefore, our force structure must include the necessary trucks, or tactical planners must anticipate far lower field artillery expenditures. We simply cannot have it both ways. 

**Major Keith W. Dayton, FA, is Secretary of the General Staff at Fort Lewis, Washington. At the time this article was written, he was executive officer for the 3-34th Field Artillery Battalion. Major Dayton received his commission from the College of William and Mary and is a graduate of the Command and General Staff College.**

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## Right by Piece

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### NOTES FROM UNITS

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**CEDAR CITY, UT**—The winner of the **Walter T. Kerwin, Jr. Readiness Award** is the **2d Battalion, 222d Field Artillery, Utah National Guard**. Every year this honor goes to the Reserve Component unit which achieves the highest level of readiness in the Army. Winners must achieve an annual training rating of excellent and have at least two organic or attached units that receive superior unit awards. The award is in honor of **GEN (Retired) Walter T. Kerwin, Jr.**, former Vice Chief of Staff of the US Army. Pictured receiving the award are from left **SGM Wilson**; **COL Ence**; **GEN Wickham**, the Chief of Staff; **GEN Kerwin**; and **Mr. Caligiuri** President of the Association of the United States Army.

### Fire Support Base GOLD Reunion

**FORT CARSON, CO**—On 21 March 1967, a large Vietcong-North Vietnamese Army force clashed with units of the 3d Brigade, 4th Infantry Division at Fire Support Base GOLD near Suoi Tre, Republic of Vietnam. When the 4-hour battle was over, American units including the 2d Battalion, 77th Field Artillery had accounted for 647 enemy casualties.

Veterans of this battle will commemorate the event at a 20th anniversary reunion on 20-21 March 1987 at Fort Carson, Colorado. The principle speaker at the banquet will be General (Retired) John W. Vessey, Jr., former Chairman of the Joint Chiefs of Staff and the commander of the 2d-77th during the Battle of Fire Support Base GOLD.

For more information contact Mr. Larry Moss at P.O. Box 775, Ferriday, LA 71334; or phone (318) 757-8500 or 757-2331.





A successful mechanic has to be able to work with his hands as well as his mind.

## Best Wrench

FORT CARSON, CO—Private First Class Daniel Tamura, who swapped medical studies at the University of Hawaii for mechanical instruction in the Army, recently won the 4th Infantry Division Artillery's "Best Wrench" award.

"I like my job," the 22-year-old native of Oahu said. "To be a mechanic you have to be able to work with your hands as well as with your mind."

At the time of the award, Tamura had been a member of Battery C, 1st Battalion, 27th Field Artillery for approximately 5 months.

The quarterly competition recognizes soldiers who put forth "the extra effort." The winner receives a Certificate of Achievement and his name goes on a trophy. (Story and photo by SFC Sunny Taylor)



CPT Albert E. Bertram

BELGIUM—Soldiers from the 100th Supply and Service Battalion, Fort Sill, Oklahoma, ground-guide an M577 command post vehicle down the ramp of a military sealift command roll-on roll-off ship during REFORGER '86.



Doctors and nurses work together with other 16th MASH personnel inside the emergency treatment unit of the field hospital during a recent field training exercise.

## A MASH Hawkeye Never Knew

FORT RILEY, KS—The 16th Mobile Army Surgical Hospital (MASH) is preparing for the real thing. Recently it conducted a field training exercise to improve its capability of providing the resuscitative surgery and medical treatment necessary to prepare critically injured patients for further evacuation during wartime or emergencies. MASH personnel manned a decontamination area, emergency treatment unit, operating room, and intensive care unit in a field environment. (US Army photos and story by Robert Shipp)

## Maintenance Awards

WASHINGTON, DC—The Third Annual Army Chief of Staff Awards for Maintenance Excellence were recently presented at The American Defense Preparedness Association's annual convention. A total of 47 Active and Reserve Component units competed for the awards. Field artillery winners from the Active Army Modified Table of Organization and Equipment category include:

- Intermediate Class—Battery C, 1st Battalion, 22d Field Artillery, US Army Europe.
- Heavy Class—6th Battalion, 37th Field Artillery, Eighth US Army.

Runners up in the Army National Guard Maintenance Shops category are:

- Light Class—1st Battalion, 175th Field Artillery, Montana Army National Guard.
- Intermediate Class—1st Battalion, 201st Field Artillery, West Virginia Army National Guard.

## Testing the PLS

FORT LEWIS, WA—Veterans like to kid about the Army's supposed "hurry up and wait" routines. But during recent tests of the medium palletized load system (PLS) truck as a prime mover for the M198 howitzer, the Redlegs of Battery A, 3d Battalion, 34th Field Artillery, were heavy on the "hurry up" and very light on the "wait."

"The test required four complete howitzer sections and demanded more from these well-trained crews than had ever been demanded before," said First Lieutenant Walter Nelson, Battery A's executive officer. The battery's sections completed 18 deliberate occupations, 18 emergency fire missions, and 18 night occupations—all in a 3-day period.

The Combat Development Experimentation Center (CDEC) Board designed and evaluated the test which involved two medium PLS vehicles—one with a six-person cab and another with a three-person cab.

Based on a design developed by the Army Development and Employment Agency (ADEA), an adaptive engineering team at the Logistics Center built crew compartments on the PLS flatracks. The compartments were able to carry 24, 155-mm projectiles and associated propellant cannisters in racks built into the sides. The compartment also incorporates cabinet space for the howitzer section's equipment and benches

for seating four crewmen.

The two medium PLS crews worked side-by-side with two standard M198 crews using the M813A1 5-ton truck as the prime mover. All crews performed the same operations in accordance with the battery's tactical standing operating procedure with one minor variation: the PLS crew compartment was offloaded behind the M198 howitzer after occupation. The crew compartment then served as a work area while the PLS moved to pick up additional ammunition.

Test results await analysis of the data, but the evaluators didn't hesitate in declaring that Battery A's howitzer crews performed superbly.

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## Aerial Resupply for the MLRS

FORT SILL, OK—Soldiers of the 6th Battalion, 27th Field Artillery (MLRS), the Army's first pure multiple launch rocket system battalion, continue to make strides in developing "how to fight" procedures for the MLRS. In a recent training exercise, the battalion conducted the first aerial resupply of the launch pod container. During the exercise the launch pod container, which holds six MLRS rockets, was sling-loaded externally and also carried internally in a CH-47 aircraft. In a CH-47D, up to four launch pod containers could be carried internally for a total of 24 rockets.



FORT CARSON, CO—Soldiers of the 1st Battalion, 29th Field Artillery Regiment trained in a variety of missions during a recent field training exercise. The live fire training stressed camouflage; nuclear, biological and chemical operations; correct convoy procedures; and responses to aggressor attacks. Emphasizing sustainability, the unit also practiced quick ammunition resupply and refueling while moving from one location to the next. Shown at left, assistant gunner PFC Kevin Spieker ties a charge before a fire mission. At right, soldiers of the 1-29th carry ammunition to their howitzer. (US Army photos by SP5 John Millar)



General John A. Wickham, Jr., Chief of Staff of the Army (right), recently presented a plaque to General John W. Vessey, Jr. on the occasion of his retirement after 46 years of service in the US Army. General Vessey was the senior field artilleryman in the US Army. The plaque commemorates the highlight of his artillery career when he commanded the 2d Battalion, 77th Field Artillery Regiment in Vietnam.

## Mobilizers Meet

FORT McNAIR, WASHINGTON, DC—The Fifth Annual Industrial College of the Armed Forces Mobilization Conference will be held on May 22d and 23d at the National Defense University's, Industrial College of the Armed Forces, Fort McNair, Washington, DC. The theme of this year's conference, "The Future Role of Mobilization in National Security," will focus on three subject areas: national security and mobilization, manpower resources management, and industrial resources management.

For more information write: Industrial College of the Armed Forces, ATTN: Mobilization Conference Committee (Colonel William Barber), Fort McNair, Washington, DC 20319-6000.

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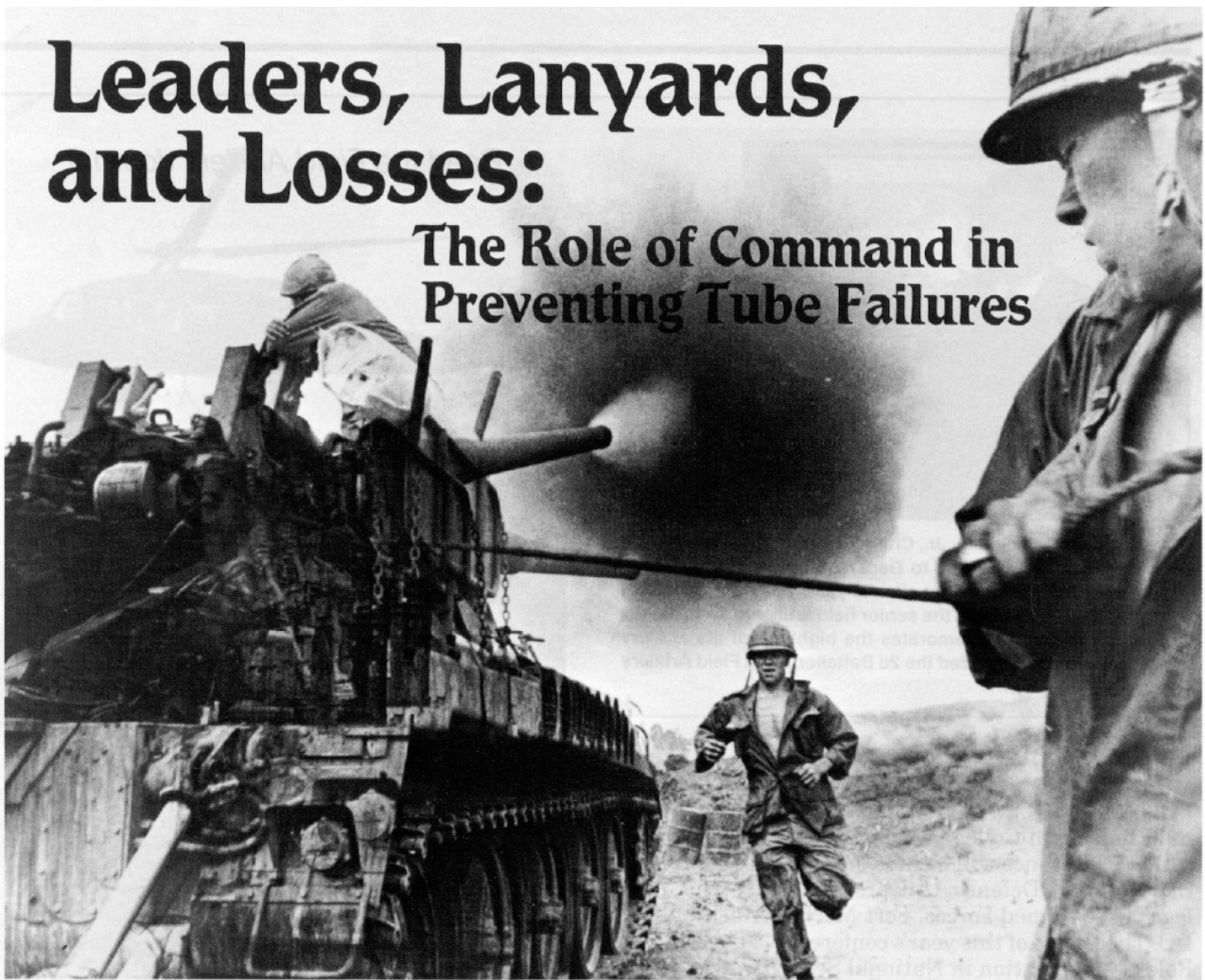
# Command Update

## NEW REDLEG COMMANDERS

COL John C. Burlingame 2d Infantry Division Artillery	LTC James E. Record 6th Battalion, 27th Field Artillery	<b>Regiments and Honorary Colonels</b> MG(Ret) George Ruhlen 3d Field Artillery Regiment COL(Ret) Vernon R. Rawie 5th Field Artillery Regiment COL(Ret) Billy H. Watson 8th Field Artillery Regiment COL(Ret) Donald Curtis 29th Field Artillery Regiment
COL John R. Cavedo 5th Infantry Division Artillery	LTC Julius E. Coats 1st Battalion, 39th Field Artillery	
LTC Albert Sleder, Jr. 1st Battalion, 27th Field Artillery	LTC Billy W. Horn 2d Battalion, 78th Field Artillery	

# Leaders, Lanyards, and Losses:

## The Role of Command in Preventing Tube Failures



by Brigadier General (Retired) Charles D. Y. Ostrom, Jr.

Inspection of artillery cannon tubes by direct support or higher echelon maintenance personnel will practically eliminate tube failures according to an *Ordnance Magazine* article entitled "Borescoping/Pullover Gaging—Two Ingredients of Cannon Evaluation" (Winter 1984). The article is correct so far as current Army doctrine is concerned but in my combat experience, the conclusions contained in current publications are misleading.

### The Problem

Inspections may alert technicians to the results of wear and occasionally will pick up a defect which might lead to a short round, but they are very unlikely to identify the source of a blown breechplug or a burst breech-ring before the incident happens.

A rupture in the area of the breech can be catastrophic for the gun crew. A tube split at the muzzle can stir up considerable adrenaline. Most of these unfortunate

events are preventable. In fact, the mechanical performance of the tube is just as much a reflection of *training* and *discipline* as is gunlaying, increment counting, and fuze setting. Unfortunately, training, discipline, design, and manufacturing deficiencies are not often going to be picked up by the two direct support maintenance inspections—pullover gage and borescoping checks.

• The *pullover gage* identifies the increase in bore diameter at a specified point near the forcing cone. This increase in diameter translates into two items of interest to the artilleryman. One is reduced range, and the other is an increase in dispersion. For a given tube design, there is a rough correlation between the amount of wear and the number of equivalent full charge (EFC) rounds fired. Many of the artillery tubes in service have not been designed to fatigue criteria, therefore EFC counting or estimating is largely

meaningless except as an estimate of wear. It does not deal with the elastic and plastic properties of the tube that govern its safety. These properties can change in the field, but a mechanical measurement won't reveal the changes.

• The *borescope* lets an inspector look at the surface of the interior of the tube. He can see gross defects such as a split land or a major crack that will strip a rotating band, but the safety connotations of these defects are highly subjective. The performance implications of a stripped rotating band are, of course, real. Therefore, prudent commanders get rid of faulty tubes when they see such defects. But a word of caution—*rough ammunition handling that damages a band can also cause it to strip*. The tube is not automatically to blame, but it doesn't hurt to look. Cracks big enough to see will probably grow, so inspectors normally recommend changing the tube for safety reasons

or because of the inconvenience of having poorly performing rounds.

## World War II Experiences

Inspection in the field by combat service support units became available fairly early in Europe in World War II. During that war, the first artillery piece to suffer a series of catastrophic failures was the M1 155-mm gun used in Italy during the winter of 1943-44. The breech block would separate from the tube every so often. Ordnance experts eventually traced the problem to a poor detail design of the 90° reentrant angle in the block where the tube was inserted. A fatigue crack started at this point invisible to external inspection and progressed until the block failed. The cold weather made the metal more brittle and helped the process along. Neither field inspection nor command intervention by better discipline or training could detect this. The problem disappeared when the sharp angle was replaced by a filet which reduced the stress concentration. Chalk one up for the weapon developers.

In the winter of 1944-45, a different problem was observed in the forcing cones of the 155-mm guns M1918 (the old GPF). These guns, when mounted on a self-propelled carriage, became the M12 155-mm gun. The M12 was highly prized by the armored divisions as attached artillery, because the division artillery had only 105-mm self-propelled howitzers. Otherwise only towed artillery was available for attachment by higher echelons. Because they were tracked vehicles and there were no substitutes, no one wanted to give up a single M12.

Most M12s were heavily used and obviously beyond service life as measured by pullover gage wear measurements. The forcing cone had often moved forward about the length of the projectile into the tube, and daylight could be seen around the rotating band from the open breech after the projectile was rammed home. This reduced the maximum range from about 20,000 yards to 16,000 yards; but the guns were still firing within the firing table probable error for accuracy.

Corrections could be computed to deal with the reduction in range. What's more, the piece was better than its most logical substitute—the 155-mm towed howitzer. It remained in service without incident until replaced by the carriage, motor, 155-mm gun M40, which mounted the 155-mm gun M1, a World War II design.

Under current gaging doctrine, a

valuable operational capability would have been discarded for no valid reason. Experience with the M12 demonstrated how rough the correlation is between wear and exterior ballistic performance. In this case, extreme wear had the expected effect of a reduction in range, but it did not manifest the other expected effect—increased dispersion. Each tube design has family characteristics of its own, and each tube has attributes within that family.

The only other artillery piece in World War II to have other than a routine history was the 75-mm aircraft cannon mounted in the B25 Mitchell bomber. It was the only tube in US Army history to be designed to fatigue limit criteria and then be put into service. The design was for a 5,000 round life before failure; and the tube was pulled from service at 1,000 rounds. None failed in service, but round counting—not gaging—was the replacement criterion. Since there were no service failures, command discipline obviously was satisfactory.

## Korean War Experiences

During the Korean conflict, the Eighth Army Ordnance Section documented 2 dozen blown breeches on the 155-mm M1 howitzer. In every case the tube itself failed by breaking into a few large pieces at the forcing cone or at the origin of the rifling. In a typical incident several members of the gun crew were wounded. Discreet inquiry turned up several blunders on the part of commanders.

- To extend the range of the 155-mm howitzer, crews fired an unauthorized green bag charge for the 8-inch (203-mm)

# Leaders

howitzer or placed additional powder increments behind the 155-mm charge. Both practices generated very high overpressures, which exceeded the howitzer's design capacity. This practice involved command approval back to the level where the fire order was computed. This was a clear leadership failure.

- In other cases, abuse of the tube occurred when crews loaded shells covered with dirt and gravel. Some crews placed C-ration cans over the fuzes causing a scream as the rounds went downrange! These antics also overstressed the tube and may have started fatigue cracks in the forcing cone area. They were a reflection on poor discipline and training.

- Then there was the practice of allowing the hot tube to cool on a loaded round. You can debate whether this creates an overpressure from high shotstart forces or whether a melted and resolidified explosive filler makes the explosive more sensitive. In either event it is poor sport and suggests judgmental problems.

The unsatisfactory equipment reports (UER) going back through command channels did not report these instances. The chief of ordnance was pressured to do something to correct what may have in fact been a brand of artillery Russian roulette. He called for pullover gage readings and the changing of tubes based on the wear reading associated with 10,000 rounds of proving ground firing. Investigators determined that this number



**During the Korean Conflict, field artillerymen put their 155-mm self-propelled howitzers into action in support of the infantry.**

# Lanyards

had some correlation with the tube exceeding acceptable firing table accuracy figures.

But in Korea the failures continued. Tube replacement rates exceeded previous wartime experience, and production facilities were being strained to fill the need for tubes. At that point the Eighth Army Ordnance Section did some two-pronged research.

- First was some pencil pushing. There were about ten 155-mm howitzer battalions in action, and close to 200

tubes had been replaced based on pullover gage wear readings. Each time a tube was replaced, an ordnance officer recorded equivalent full charge rounds officially fired as indicated in the gun book data (now DA Form 2408-4, *Weapon Record Data*). These statistics eventually allowed for the production of tables showing the number of tube failures in a given battalion and the average number of equivalent full charge rounds fired per tube in that battalion when a tube was changed based on the maximum wear reading. Two battalions fired about 12,000 EFC rounds per tube before changing tubes based on gaging. Neither battalion had any burst tube incidents. One battalion recorded only

3,500 EFC rounds per tube between changes. That battalion had three burst tubes reported. In between the extremes were round averages for the rest of the battalions with one or two failures per battalion reported. Paradoxically, the two-failure battalions changed tubes more frequently based on gun book EFC data than did the one-failure battalions.

Subjectively, this suggested poor bookkeeping because fire missions did not vary that much among battalions. But the extrapolation also suggested poor training and discipline all along the line. It was enough to have the Commanding General of the Eighth Army suggest the relief of any battalion commander who had a burst tube in the future.

- Concurrent with the pencil pushing, ordnance officers ran a practical experiment. They placed into a trench a condemned tube with a crusher gage inserted in the chamber, and then loaded it with an unfuzed shell and an 8-inch (203-mm) howitzer green bag charge. When the round was fired, the tube held together. The crusher gage measured about double the design pressure. The experimenters repeated the procedure with the same tube. The results were the same as the first firing; so a third repetition was fired. This time, the interrupted thread of the breech plug was sufficiently turned to prevent a fourth round from being fired. The breech simply could not be closed. The experimenters concluded that the tubes were almost impervious to deliberate abuse.

Next, experimenters wanted to see what a high-order burst in the tube would look like. They loaded another condemned tube with a live point detonating fuzed round. All safeties were removed from the fuze. The barrel



A 105-mm shell is loaded into the breech of one of the cannons being tested at Aberdeen Proving Ground, Maryland.



The degree of distortion of a copper sphere within this cylinder enables testers to measure the pressures exerted on a cannon assembly when it is proof tested.

was blocked after 1 foot of shell run. When the howitzer was fired, the barrel was cut at the point of blockage for the length of the shell. The fragments were small and not like the few large chunks seen in the accidents. Therefore, the experimenters surmised that actual firing accidents were probably not caused by a high-order projectile function.

Overall, this entire recital indicates that the Korean era failures occurred due to a variety of reasons; most, if not all, of which were associated with an extraordinary event in the life of the tube. This might be an extreme overpressure due to a charge overload; an interference fit between the shell and chamber that exerted very high radial stress; or possibly a low order explosion due to a leakage of explosive from the shell or sensitizing of the explosive within the shell. None of these could be detected by the support maintenance people. However, all are within the purview of the chain of command.

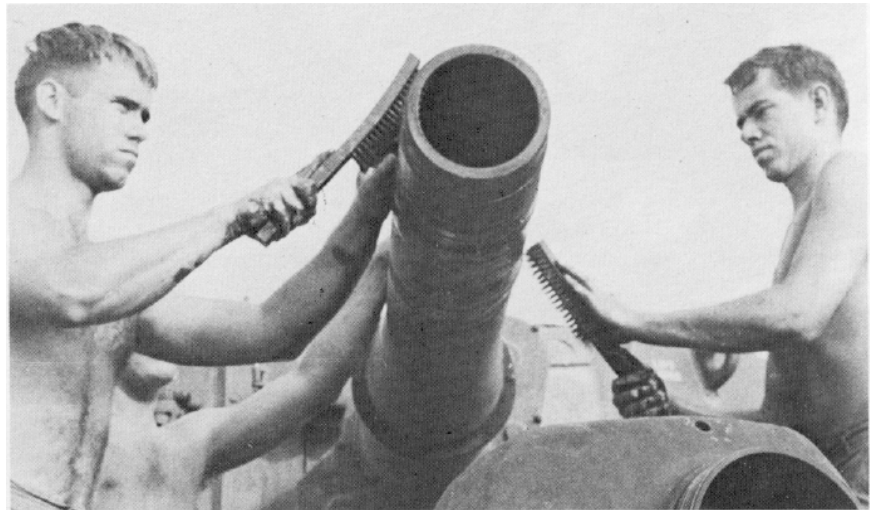
Ironically, throughout the winter-spring of 1951-52, at least four more 155-mm M1s in Korea burst at or near the origin of rifling. Again several large pieces resulted from the failure. Two of the four tubes could be examined and in both cases fatigue cracks were found that started from the boundary between the tube liner and tube and worked out through the tube to the surface. Since the tube is heat-shrunk on the liner, no field examination could detect the flaws. These fatigue cracks were probably initiated by a machining mark. Chalk this up to the procurement process.

## Vietnam Experiences

Vietnam yielded the case of the 175-mm gun. The 175-mm propelling charge is very intolerant of rough handling. Specifically, it is very sensitive to ignition conditions, and an abnormal combustion sequence will give high chamber pressures. Tubes were changed more and more frequently as pullover gage readings and allowable EFC counts were reduced. Yet tubes continued to burst.

In consequence, ordnance experts prepared an instrumented tube actually drilled through in several places to insert pressure gages. They used the tube to fire more than 2,200 rounds at Aberdeen and Yuma Proving Grounds. At the same time, research and development people accidentally blew one breech plug about 200 yards to the rear of the piece and then burst a second tube at the

# and Losses:



**Bore evacuator cleaning of a 155-mm howitzer was a messy but important job as Vietnam War era soldiers prepared the piece for combat.**

breech as the result of recorded chamber over-pressures in the 120,000 pounds per square inch range. You can get that in a normal 175-mm round if you rough-handle the propelling charge; the outcome can be unfortunate indeed!


Discipline and training all along the line from the depot to the firing position are necessary to prevent the occasional charge from being abused to the extent that it will blow the weapon. This particular cause of failure needs attention today. The high zone charges for the 155-mm M198, the 155-mm M109A2, and the 203-mm M102A2 all are susceptible to the same occasional accident if discipline fails.

Another failure experienced in Vietnam was the bursting at the breech of the 105-mm M101A1 howitzer. The author saw two of these damaged howitzers and heard of a number of other instances in the Vietnamese artillery. Vietnamese gunners admitted that they let the tube freeze on a loaded round. The tube damage seen in the two US howitzers was the result of overpressure, and the tubes looked much like the abused 155-mm howitzer of the Korean Era. The suspicion here is that the Comp-B loaded shell

became sensitized by being left in a hot tube, and a low order occurred.

It is probably worth mentioning that Comp-B as a shell load is at least ten times more sensitive than TNT—the normal load prior to Vietnam. Thus, leaving a shell in a hot tube today will yield many more accidents than have happened in the past. It is a price that must be paid for the increased effectiveness of Comp-B. Nevertheless, the bottom line is clear. Discipline, training, and command emphasis, *not* borescopes and pullover gages, are the keys to tube safety.

## Conclusion

As more and more is demanded of the designer both in the reduction of weight and in the improvement of ballistic performance, weapon systems—tubes and ammunition combined—are going to demand more and more command supervision. Weapon systems are becoming more fragile and have closer tolerances than those of a generation ago. The challenge to designers and commanders alike is to ensure that soldiers aren't given the opportunity to play Russian roulette with big guns. 

**Brigadier General (Retired) Charles D. Ostrom served during World War II as the ammunition officer for Headquarters Western Defense Command and Fourth Army; Headquarters Fourth Army; and Headquarters Ninth Army. During the Korean Conflict he was the first ammunition officer for the Eighth Army and later served as the assistant ordnance officer for Headquarters Eighth Army. General Ostrom has also held various research and development assignments throughout his career.**



by Captain Alan A. Hamill and Second Lieutenant Peter F. Davis

Imagine the exasperation of your corps commander when he learns that a small commando force has just cratered the only runways capable of accepting the C-141s and C5As which were to airlift your division artillery's much needed troops and equipment into strife-ridden Rio Bravo. The corps commander has assured the President of Rio Bravo that his rapidly deployable light forces can get on the ground fast and provide immediate assistance to the fledgling democracy's small police force. He has promised to deal quickly and decisively with the wholesale conventional intervention launched out of a neighboring Marxist state. But now these commitments look questionable. What your corps commander needs is an aircraft capable not only of making the long haul with heavy loads but also of landing on the undeveloped airstrips that surround Rio Bravo's capitol. What your commander needs is the *C-17*.

At present, the Military Airlift Command's fleet contains a mix of C-130, C-141, and C-5 aircraft. All three have vastly different capabilities. For example, the C-130 is primarily a light payload, short-range, small airfield aircraft. The C-141 and C-5 are larger payload, long-range airplanes which require longer airfields, larger taxiways, and more ramp space. Complemented by the commercial aircraft of the Civil Reserve Air Fleet, these airplanes can carry over 32 million ton miles of cargo daily. Unfortunately, that figure falls far short of the minimum goal of 66 million ton miles per day established by a congressionally mandated mobility study.

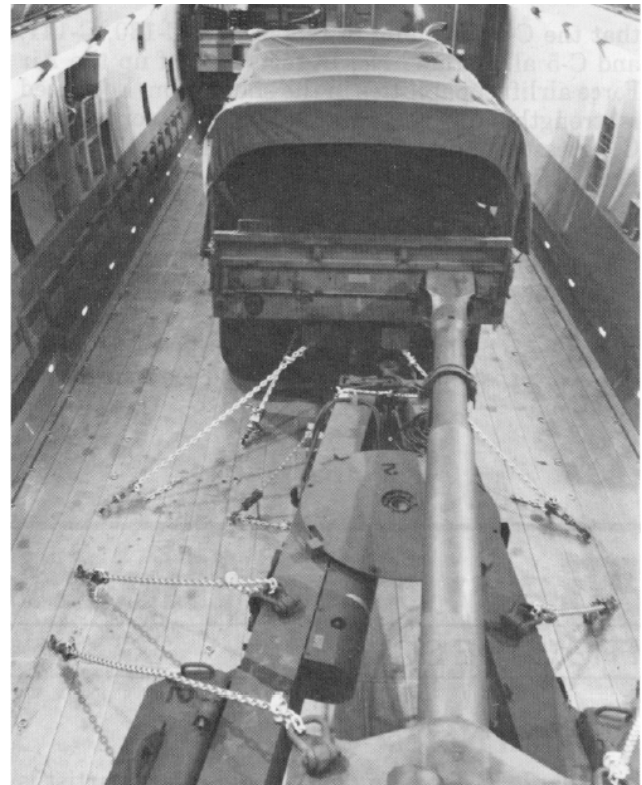
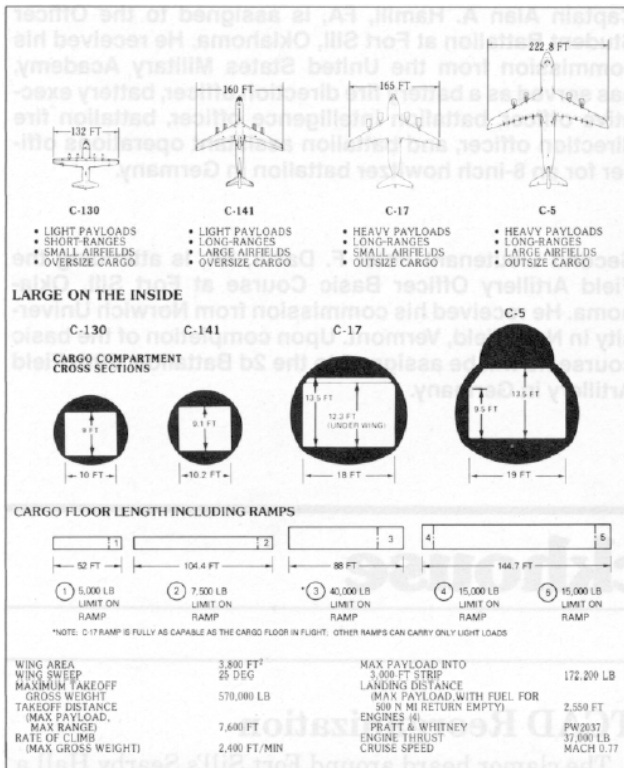
What's more, only the C-130s are capable of landing on small, unimproved airfields.

The advancing age of the current fleet provides yet another problem. By 1990, the majority of C-130s now in use will be over 30 years old. Modifications can, of course, keep many C-130s in the air, but as aircraft age increases these changes become prohibitively expensive. In fact, large numbers of C-130s will have to be phased out of the inventory during the 1990s, and the C-141 fleet faces a similar situation. By 1990, the average C-141 will be 20 years old; Air Force experts believe that they won't prove serviceable past the year 2015.

What it all boils down to is this: With its existing fleet the Air Force cannot meet its strategic airlift goals. The Military Airlift Command needs an aircraft that can handle heavy payloads, land on small airfields, and bring the total cargo lift capability into line with established requirements. Air Force leaders believe the McDonnell Douglas C-17 provides the aircraft they need. It not only combines the payload capacity of the C-141 and C-5 with the landing abilities of the C-130, it also does much more.

Naturally, Air Force developers considered building more of the proven aircraft like the C-130 Hercules and C-141 Starlifter. However, they understand only too well that aircraft technology has changed dramatically since engineers designed these workhorses of the 1960s and 70s. It makes better sense today to build a new, more efficient and survivable aircraft based upon the proven technologies of the 1980s.





An interior and exterior specification comparison of the C-130, C-141, C-17, and C-5 aircraft.

The C-17 will provide the payload capacities of the C-141 and C-5 with the landing capabilities of the C-130.

One such established technology is the Pratt and Whitney PW2037 engine. By the time the first production model of the C-17 comes in service, the PW2037 will have flown more than 3½ million hours of commercial service on the Boeing 757. What's more, it will have demonstrated unprecedented capabilities. By running the engines in reverse idle, the thrust is directed up and toward the front of the aircraft making cargo unloading more rapid and less hazardous. This capability also allows the engines to remain running and provides for faster turn-around times.

Even more significantly, the C-17 will give commanders in the field a flexible efficient inter- and intra-theater performer. With the maximum payload of 172,200 pounds, the C-17 can fly 2,400 nautical miles; land on a 3,000-foot airfield; unload; and still be able to fly to a destination 500 miles away.

The construction of the C-17's ramp provides another tremendous step forward. The ramp on older cargo aircraft could handle only light payloads. The C-130 ramp, for example, has a limit of 5,000 pounds; the ramp on the C-141 can handle 7,500 pounds; and the C-5's two ramps can accommodate 15,000 pound loads. The C-17 ramp is rated at 40,000 pounds. In fact, McDonnell Douglas claims that the entire cargo of a C-130 can fit on the ramp of the C-17.

The C-17's cargo floor is 88 feet long including the ramp, 18 feet wide, and the ceiling varies in height from 12 to 13 feet. With that much room, the single load master can park most large vehicles in two rows and jeeps in rows of three. A single C-17 can airlift six 105-mm howitzers, six


high-mobility multipurpose wheeled vehicles, and 54 crewmen; or it can carry three 155-mm (M198) howitzers, three 5-ton trucks, and 33 men. All of this equipment can be loaded without being disassembled. Such capabilities should prove comforting to hard-pressed leaders like the corps commanders whose plight was mentioned earlier. Moreover, loads need not be limited to light forces. The C-17 is perfectly capable of transporting the M110 8-inch howitzer in a full-up combat configuration.

Of course, short take off and landing (STOL) is the most impressive feature of the C-17. Fully loaded, the airplane can land on a 3,000-foot airfield. This is an absolutely essential capability. The number of available runways that are 5,000 feet or longer in live contingency areas is around 1,600. Yet, the number of paved and unpaved runways that are 3,000 feet or longer is almost 10,000. These figures exclude those in the United States but do include those air fields found in the most other areas around the world. In the event that conditions don't allow even the C-17 to land, the new airlifter is capable of airdropping heavy equipment or employing the low altitude parachute extraction system (LAPES).

Paradoxically, the crew requirements for this remarkably capable aircraft are only three persons: two pilots and one load master. This sparse crew gives the C-17 the lowest aircrew requirements of any large military aircraft.

The Air Force will receive the first C-17 by 1990, and it will be followed by 209 more. Does this mean

that the C-17 is going to replace the C-130, C-141, and C-5 altogether? No! In fact, to beef up the Air Force airlift capabilities in the short term, Lockheed is strengthening 50 C-5Bs for delivery prior to 1991. Congress has also authorized an additional 50 Lockheed C-5s and 44 McDonnell Douglas KC-10 strategic transports and proposes to convert 19 Pan Am 747s for use in the Civil Reserve Air Fleet.

With the addition of the C-17, the Military Airlift Command will have found a cost-effective way of fulfilling the goal of 66 million ton miles of cargo a day. It will have built a flexible system that every hard-pressed corps commander can use to see that his job gets done. 

**Captain Alan A. Hamill, FA, is assigned to the Officer Student Battalion at Fort Sill, Oklahoma. He received his commission from the United States Military Academy, has served as a battery fire direction officer, battery executive officer, battalion intelligence officer, battalion fire direction officer, and battalion assistant operations officer for an 8-inch howitzer battalion in Germany.**

**Second Lieutenant Peter F. Davis, FA, is attending the Field Artillery Officer Basic Course at Fort Sill, Oklahoma. He received his commission from Norwich University in Northfield, Vermont. Upon completion of the basic course he will be assigned to the 2d Battalion, 29th Field Artillery in Germany.**

# View from the Blockhouse

## FROM THE SCHOOL

### Journal Notes

Edward Gordon Craig once noted that an artist is "one who perceives more than his fellows, and who records more than he sees." Had Craig merely altered the gender of his observation, he would have captured the essence of the *Journal's* own Jean Linnell Halloran. Throughout her 2½ years as the *Journal's* Art Director, Jean has peered deeply into the soul of the artillery and recorded in images and designs more than most Redlegs will ever see.

Jean has been our catalyst, our critic, and our friend; but most of all she has been our creative champion. She has transformed our *Journal* into the benchmark for all branch periodicals, and in the process she has made Redlegs everywhere more professional.

The *Journal* and the entire Field Artillery Community are strong magnets for Jean, but the call of the rancher's life has an even weightier attraction. So, we must bid our talented friend and colleague farewell. But as we do, every true artilleryman must say, "Thank you, and happy trails to our Redleg artist — Jean Halloran."

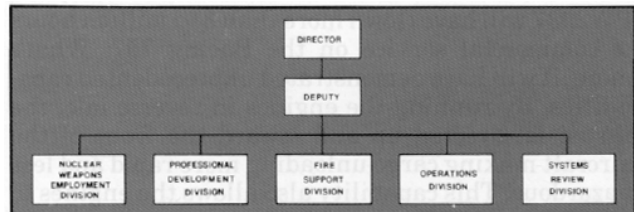
### Upcoming Journal Themes

Issue	Theme
May-June 1986	Tactics
July-August 1986	Doctrine and Development
September-October 1986	Field Artillery History
November-December 1986	The Red Book
January-February 1987	The Threat
March-April 1987	Combat Support

### TCAD Reorganization

The clamor heard around Fort Sill's Searby Hall a few weeks ago was the sound of soldiers moving desks and files as the Tactics and Combined Arms Department (TCAD) reorganized. The process gave birth to several new divisions while several other offices retired their colors.

TCAD has been reorganized with the following divisions:



**Nuclear Weapons Employment Division**—remains the same as has the Employment Branch. They teach Nuclear and Chemical Target Analysis, Target Analysis and Planning (TAP), and the Nuclear Weapons Detachment Commander Course (NWDC).

**Professional Development Division**—has Leadership and Special Subjects Branches. The Professional Development Division is planning to pass writing courses to the Directorate of Training and Doctrine in the near future.

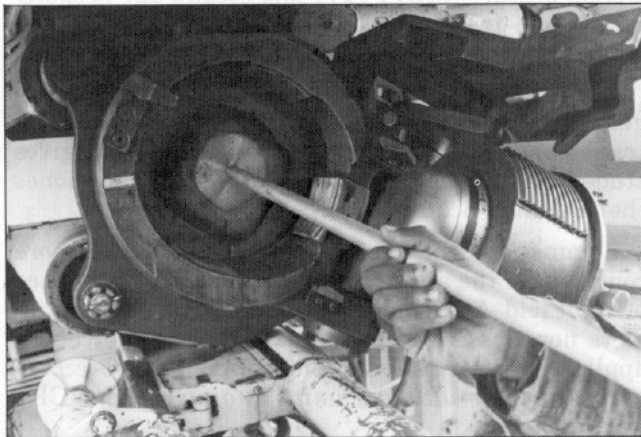
**Fire Support Division**—assimilated the old Artillery Tactics Division and Maneuver Branch. It now features a Tactics Branch as well as Basic and Advanced Fire Support Branches.

**Operations Division**—remains the same.

**Systems Review Division**—the former Systems Branch of the Artillery Tactics Division with the added responsibilities for the fire support vehicle (FSV) and new equipment training teams (NETT). It has NETT and Evaluation Branches.

## BATTLEKING

- **BK 57-85, Chamber Swabs** (Source: Break-Free Corporation). BATTLEKING has completed testing a new improved chamber swab for 155-mm and 8-inch cannons. The new swab is a high density, low absorption polyurethane material encased in a heavy-duty nylon mesh. It is resistant to ultraviolet light, carbon, and oil. It absorbs less fluid and outperforms and outlasts the current cellulose sponge. The test swab lasted for over 2,500 firings. That means with normal use, the new swab should last approximately 2 years. The present cellulose and field expedient sponges require replacement every 2 to 3 months.

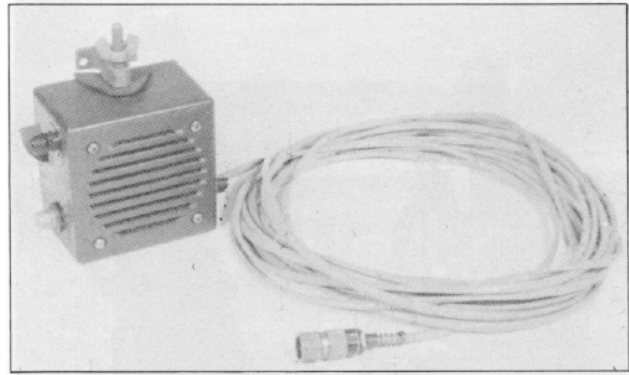


The new polyurethane chamber swab.

The polyurethane swab is currently available only through local purchase from the manufacturer. The Artillery Center has initiated action to have it stocked in the self-service store at Fort Sill, and recommends that all 155-mm and 8-inch cannon battalions request their self-service supply centers to acquire the new item. They can be procured from Break-Free Division, San/Bar Corporation, 9999 Murlands, Irvine, CA 92718; (714)855-9911. The cost of the 155-mm swab is \$10.10 each and the 8-inch swab is \$12.90 each.

The new swab is currently undergoing further tests at the Benet Weapons Laboratory, Watervliet, New York. A copy of the BATTLEKING test report is available by writing President, US Army Field Artillery Board, ATZR-BDO (BATTLEKING), Fort Sill, OK 73503-6100, or call Mr. Edgar Gunn, AUTOVON 639-4075/3717.

- **BK 64-84, LS-454 Speaker as a Radio Remote** (Source: MAJ Barfield, USAFABD). Field artillery command posts must be able to operate in one of three different configurations: inside the command post vehicles, in a track extension or tent, or in a building near the command post. In most cases the AN/GRA-39 must be remoted less than 50 feet. For



The LS-454 auxiliary speaker modified for use as a short range radio remote.

these short distances it may be possible to construct a remote device that does not use any batteries. With such a device, the dollar savings and battery stockage requirements could be reduced substantially. An LS-454 auxiliary speaker can be modified, with a five-pin connector, to incorporate a handset and a speaker volume control knob. The results are a remote device that uses cable to span the distances required. The idea is to provide users with an easily fabricated, low-cost radio remote. The Communications and Electronics Division, USAFAS and USAFABD, evaluated this proposal. Plans are available from the Field Artillery Board. For more information, contact: President, US Army Field Artillery Board, ATTN: ATZR-BDW(BK), Fort Sill, OK 73503-6100.

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## History Writing Contest

The United States Field Artillery Association is sponsoring its first annual history writing contest. The theme for 1986 is "The field artillery's role in close support of the maneuver arms." A panel of three historians—a commissioned officer, a noncommissioned officer, and a civilian—will judge each entry using a threefold criteria.

- Utility of the article to today's field artilleryman.
- Rhetorical effectiveness of the piece.
- Originality of thought.

The manuscripts must be 2,500 words or less and typed double-spaced. Writers should send their submissions to the Field Artillery Association's national headquarters at P.O. Box 33027, Fort Sill, Oklahoma 73503, by 1 May.

The Field Artillery Association will award the top three winners cash prizes of \$300, \$150, and \$50 respectively. The staff of the *Field Artillery Journal* will consider all submissions for inclusion in future issues, and the Association will provide interested members of the Field Artillery Community copies of all submissions at a nominal fee.



SSG Robert Logan

**During a field training exercise, students supply survey data for three firing batteries.**

## A Super School for Surveyors

Leaders of the Field Artillery School's Target Acquisition Department have recently expanded the 82C Field Artillery Surveyors Course to include a 3-day field training exercise (FTX). The realistic exercise allows students to apply those skills acquired throughout the 9-week, 4-day course.

The US Army Training and Doctrine Command and the Field Artillery School are always seeking ways to make training more worthwhile for soldiers undergoing advanced individual training (AIT). The latest proposal is to require all military occupational specialty (MOS) certifying courses to take students to the field for at least 3 days to expose them to a more realistic training environment. Most MOS courses at Fort Sill currently do not include a scenario-driven 3-day FTX, but School leaders are working hard to change that situation.

Of course, a bold change such as this requires not only the rewriting of entire programs of instruction, but also the realignment of resources. Despite these obstacles, Survey Division instructors and a cadre from Battery F, 6th Training Battalion have formulated and are now executing a first-rate, scenario-driven field training exercise.

Comments from students participating in the training have been very positive. Most soldiers remark that the FTX provides a fitting culmination to their AIT instruction. "Most of us didn't even realize what real survey was until we came out to the field to participate in the FTX," remarked one student. "We were turning angles on 'the line,' and adding logarhythms in the classroom, but it didn't mean anything to us until now," said another. "I wish we could have two FTXs—one at the beginning of the course—and then one at the end," commented a third soldier.

The survey FTX comes during the eighth week of

training and includes a full 3 days and 2 nights of surveying along Fort Sill's North Boundary Road. The scenario calls for the students to act as a battalion survey section assigned to the Headquarters and Headquarters Battery, 1st Battalion, 34th Field Artillery. The section's mission is to supply survey data for three firing batteries and to establish at least two observation posts in a target base. The students also supply other survey support as required throughout the notional area of operations.

The 56-period FTX requires students to use *all methods* of field artillery survey to provide control in position, connection, and target areas. Although sleeping and eating are accomplished administratively, all other functions are performed tactically. For example, the first day of the FTX includes 6 hours of night survey done in mission oriented protection posture (MOPP) IV. The second day is spent taping and traversing, and the third day includes triangulations and simultaneous observations.

The Artillery Training Center works with the Target Acquisition Department by providing administrative and logistical support. The entire FTX gives students a well-rounded realistic training that hones their recently acquired skills.

Commanders in the field can now be even more confident of the abilities of newly arrived graduates of the Field Artillery Surveyors Course. These soldiers now possess technical expertise reinforced by application in a realistic environment, *before they arrive at their ultimate units of assignment.* (CPT Jay Stephens)



## M198—Check that Flex!

The M198's flexible nonmetallic brake hose assembly (NSN 4720-01-036-3687) may be pinched in the hinge area of the right trail when the crew closes the trails. The howitzer may then jackknife due to the lack of air or insufficient brake action. Furthermore, the line may subsequently rupture causing a complete loss of the brakes. The only way to prevent the brake line from being pinched is for chiefs of section to watch the hose as the crew closes the trails and then check again when the trails are completely closed to ensure that the hose swiveled properly.

## Getting the STRAC Straight

In March 1982, General John W. Vessey, then the Vice Chief of Staff of the US Army, established the standards in training commission (STRAC). The mission of STRAC was to determine the quantities and types of munitions essential for soldiers, crews, and units to attain and sustain weapon proficiency relative to readiness levels, making maximum use of aids, devices, simulators, simulations, and subcaliber firing. Several issues necessitated the development of STRAC. They included: the constant increase in the cost of ammunition; the depletion of current training ammunition stockpiles; and finally, the Army's capability to defend its ammunition budget before Congress.

The Deputy Chief of Staff for Operations and Plans (DCSOPS) acts as the STRAC Chairman. The current chairman, Lieutenant General Carl Vuono, advises the Chief of Staff and the Vice Chief of Staff of the US Army on STRAC matters. The Army Training Support Center (ATSC) at Fort Eustis, Virginia, is the Department of the Army STRAC executive agent and manages the program. Six proponent schools—Air Defense, Armor, Aviation, Engineer, Field Artillery, and Infantry—are responsible for developing the STRAC standards and strategies for their weapon systems. The program, which applies to both the

Active and Reserve Components, specifies not only a prescriptive standard and ammunition allocation, but also a suggested strategy to meet that standard. Currently, there are 48 weapon systems in the STRAC program, with the eventual goal to include all Army weapon systems. The 105-mm, 155-mm, and 203-mm howitzers and the multiple launch rocket system make up the field artillery systems included in STRAC.

DA Circular 350-84-2, *Standards in Weapon Training*, documents the program. The field artillery standards and strategies can be found in appendix C of that publication. STRAC was fully implemented on 1 October 1985 and will eventually be tied to the Unit Status Report system.

STRAC is dynamic and will change as doctrine and equipment change. The Army Training Support Center has installed a STRAC hotline to answer any questions or offer any suggestions about the program. Contact them at AUTOVON 927-3090 or commercial (804)878-3090; or write to Commander, United States Army Training Support Center, ATTN: ATIS-SP, Fort Eustis, VA 23604-5166. The address of the STRAC point of contact within the Field Artillery School is Commandant, United States Army Field Artillery School, ATTN: ATSE-DUA, Fort Sill, OK 73503-5600; or call AUTOVON 639-5004 or commercial (405)351-5004. (CPT Lawrence L. Johnson)

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# Fragments

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## FROM COMRADES IN ARMS

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### A HEL of an Idea

Two Army research labs are looking at ways to store artillery rounds more safely at camps in Korea, where the need for quick response requires that Redlegs be close to their ammunition.

In Korea, a lot of ammunition stays loaded on trucks and trailers, ready for deployment. With the trucks parked next to each other, the detonation of one round could wreak havoc throughout the ammunition holding area. Explosions of that magnitude would send fragments flying into nearby troop areas, causing significant casualties and damages.

For the past year, researchers at the US Army Ballistic Research Laboratory (BRL) and the US Army Human Engineering Laboratory (HEL) have been looking at alternative storage methods.

John D. Waugh, a human factors engineer at HEL, said one goal is to devise practical solutions to the problem that would not affect the troops' ability to deploy rapidly with

their full complement of ammunition. One solution proposed is the reconfiguration of artillery projectiles and propellant charges on each truck. Such a repositioning would cushion each section of projectiles with propellant charges, rather than grouping all projectiles together. With the nonexplosive propellant charges absorbing some of the energy from detonated projectiles, the explosion could be limited to a truckload or part of a truckload.

Another proposal calls for protective shielding on projectile pallets inside the truck. Research has shown that when adjacent projectiles are detonated, a crude but effective shaped charge-type jet is formed that further increases the chance of propagation to other truckloads of ammunition. BRL has devised some simple shielding techniques to diffuse the jets that form and reduce the probability of further propagation.

Castor-mounted concrete slab shields are also being evaluated that can be positioned between ammunition trucks to prevent the spread of explosion. The special slabs are made of a foamed concrete cinder block material.

## Masters of Transportability

Do you know how the Army ensures that field artillery equipment reaches trouble spots around the globe? The Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) does. It works hard to build in transportability so that artillery systems are strategically deployable.

Transportability is the inherent capability of materiel and units to be moved by existing or planned transportation assets. To ensure that fire support systems get to the theater of operation, transportability is a must.

MTMCTEA's early involvement in the development of the multiple launch rocket system (MLRS) provides an excellent example of how the Army meets the transportability challenge. When installation of the MLRS's loader-launcher mechanism necessitated the removal of existing rear lifting eyes, MTMCTEA took an active role in ensuring that the vehicle's lifting provisions would still meet transportability requirements. With the help of MTMCTEA, the program manager's office and the contractor corrected the problem with a design modification.

Other MLRS-associated efforts by MTMCTEA included coordinating a test-loading of the MLRS on the US Air Force's C-141 aircraft and recommending some weight reductions by the removal of on-board equipment. This action kept the MLRS within the maximum payload capacity of the C-141. MTMCTEA also participated in a rail impact test to ensure that the MLRS would withstand the rigors of rail transport. MTMCTEA went on to develop procedures for loading the MLRS on all transport modes including US and foreign rail, and published them in a transportability guidance technical manual.

The successful fielding of MLRS is just one example of the fine work done by MTMCTEA transportation



MTMCTEA officials supervise the test-loading of an MLRS on the C-141 aircraft.



MTMCTEA participated in a rail impact test to ensure that the MLRS would withstand the rigors of rail transport.

engineers. They also act as highway engineering consultants for installation commanders; provide functional analyses of multimodal transportation systems; develop guidance and criteria for transporting materiel by all modes of transportation; and administer the Department of the Army portion of the Department of Defense Engineering for Transportability Program.

Another example of a service that MTMCTEA engineers provide is the key transportability guidance they prepared for the M992 field artillery ammunition support vehicle (FAASV). This guidance will appear in TGTM 55-2350-267-14 early this year.

An example of a multimodal transportation engineering analysis is the Installation Transportation Systems Capability Study done on Fort Sill, Oklahoma. This study identified the most efficient methods of deployment available to meet immediate mobilization requirements. Its major objectives were to:

- Determine the capability of Fort Sill's rail, motor, and air facilities to support troop units.
- Identify required improvements to Fort Sill's facilities.
- Survey commercial rail and air facilities near Fort Sill to determine their capability to enhance Fort Sill's outloading operations.
- Provide a railcar switching plan that could be used during rail out-loading operations.

Recommendations in the study included procurement of three portable end-loading ramps so the rail and motor facilities at Fort Sill could support the deployment of scheduled troop units; stockage of adequate amounts of blocking, bracing, packing, crating, and tie-down materials for deployment; and use of area airports for airlift operations.

Transportability and transportation assistance is as close as the telephone. Simply call MTMCTEA at AUTOVON 927-4646 or commercial (804) 878-4646; or write to Commander, MTMC Transportation Engineering Agency, ATTN: MTT-TR, P.O. Box 6276, Newport News, VA 23606-0276.

## Something New in Combat Service Support

North Atlantic Treaty Organization exercise Flinker Igel provided a field trial for the 1st Armored Division's newly formed 3d Forward Support Battalion. The division now has three forward support battalions (FSB) and a main support battalion (MSB).

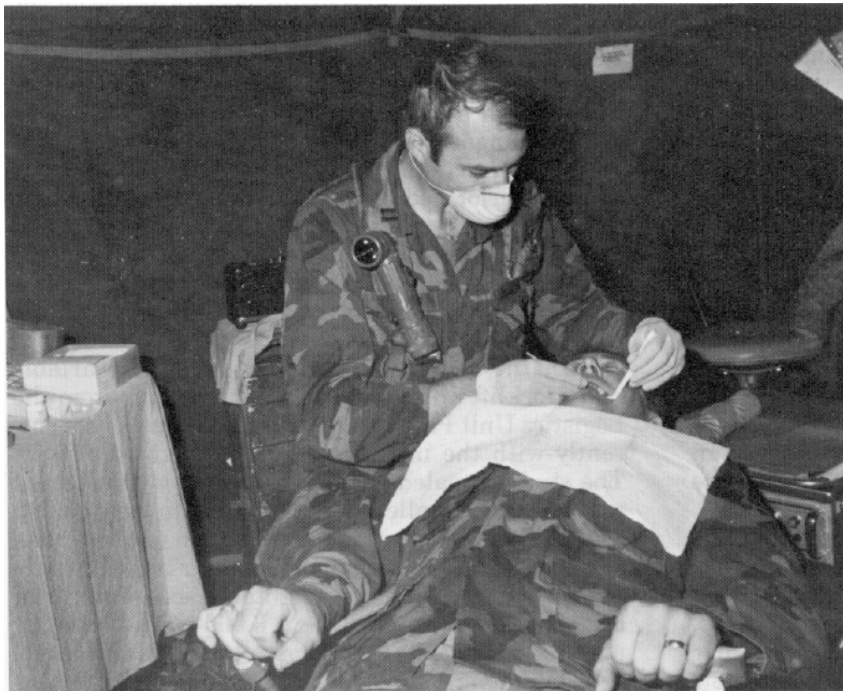
In the past, composite units drawn from the various battalions in the division support command (DISCOM) supported brigades in the field. Now each brigade has a support battalion headquarters and staff that give dedicated support to units both in garrison and in the field. Each new forward support battalion has a supply and transport company and a maintenance company as well as a headquarters detachment. A medical company will also be added. The main support battalion will have light and heavy maintenance, supply and service, and medical companies.

Not only do the maintenance support teams in the forward support battalions add a maintenance capability to the battalion, they also enhance logistical support and provide a faster response time to the supported brigade.

Another big advantage to the forward support battalion concept, which calls for providing support as far forward as possible, is the close relationship of the battalion soldiers and the soldiers in their supported brigade. When a unit goes to the field, its support goes with it.

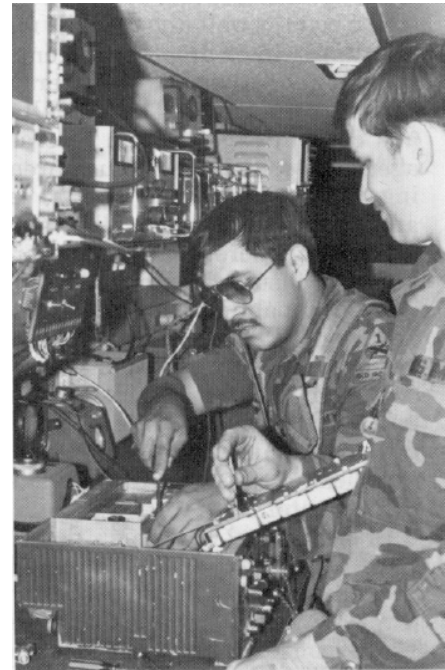


**Power for equipment in the field comes from generators that must be serviced. The forward support battalion provides maintenance support teams for this vital role.**



Photos by Roger Conroy

**Soldiers need medical and dental care—the forward support battalion provides these services.**



**Maintenance of radios and electronic equipment is vital to keep fighting elements in constant communication.**



Members of a well-drilling crew remove a piece of the drilling section from the ground.

## Where's the Water?

Who gets the call when soldiers need water? A group of green suited well diggers, of course. Today, the Active Army has four engineer detachments to fulfill military well-drilling requirements during training exercises and actual operations.

The Army's well-diggers will receive considerable assistance in evaluating potential ground water sources as the Corps of Engineers forms water detection response teams. These small groups of military and civilian experts from several different federal agencies—specialists in such areas as remote sensing, geology, hydrology, civil engineering, and archeology—will be on-call to support joint service operations where local water sources are either unknown or insufficient for military use.

Their capabilities will be particularly useful in arid regions. Evaluating well sites involves interpreting geological factors, analyzing geophysical data, and making complex technical judgments—tasks which drilling crews are neither trained for nor equipped to handle. In fact, in a desert area, even an experienced crew may drill several dry wells before hitting water.

Under normal conditions, detection teams will be able to locate well-drilling sites and provide guidance to drilling crews so that water will be available within 2 weeks of a commander's request for support. The response teams will be operational in fiscal year 1987, but ad hoc teams have already proven their worth in several military training exercises in the Middle East.



The rough terrain crane will provide faster loading and unloading of ammunition and containers.

## Roughing It

Ammunition handlers will be pleased by the forthcoming delivery of the rough terrain crane. Ordnance specialists at corps marshalling areas and ammunition transfer points will use the crane for faster loading and unloading of ammunition and containers. Capable of lifting up to 67,200 pounds, the new crane will replace the 50,000-pound rough terrain container handler and the 20-ton rough terrain crane in general support ammunition units.

Engineers at Fort Belvoir's Research and Development Center drew performance specifications for the crane under the Army's nondevelopment item (NDI) program. This approach allows for the acquisition of equipment already available in the commercial market. More significantly, it eliminates the cost of development.

Designed to take advantage of research and development performed by industry and Allied nations, the NDI process consists of market surveillance and investigation followed by the development of a technical data package. The package includes performance specifications and requirements for training manuals, spare parts, and accessories.

Both the rough terrain crane and the variable reach forklift are NDI initiatives resulting from the Logistics Unit Productivity Study conducted concurrently with the introduction of the light divisions. The study revealed that state-of-the-art equipment would allow smaller organizations to accomplish critical support tasks faster. The rough terrain crane surpasses the 50,000-pound container handler in its ability to lift containers in tighter spaces. The variable reach forklift will have a 6,000-pound capacity and work alongside the crane to unload containers. Due for delivery in fiscal year 1988, the forklift joins the crane as another "off-the-shelf" solution to a weighty problem. (CPT Carlton Reid)



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# Redleg News

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## ITEMS OF GENERAL INTEREST

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### Additional Skill Identifiers

An additional skill identifier (ASI) is contained in the sixth and seventh characters of the military occupational specialty codes (MOSC). It identifies skills acquired through functional training or on-the-job training (OJT) in maintenance and the operation of weapon or equipment systems or subsystems not identified by an MOSC.

Currently, there are a number of ASIs associated with the field artillery career management field (CMF) 13. These include:

<u>Code</u>	<u>Title</u>	<u>MOS</u>
H1	Meteorological Equipment Maintenance	93F
Q8	Tactical Air Operations	13F, 13Y, 13Z
S8	Multiple Launch Rocket System (MLRS) Organizational Maintenance	13M
U6	Field Artillery Weapons Maintenance	13B
X3	TACFIRE Operations	13F, 15J, 17C
X5	Radar Maintenance (Firefinder)	13R
Z3	Lance Organizational Maintenance	15D
Y1	Pershing II	15E

The computers supporting the enlisted personnel management system use the ASI to locate, nominate, and assign soldiers with a particular skill to a job



**A 13B crewman performs maintenance checks during a REFORGER exercise.**

where that skill is needed. An ASI is awarded to those soldiers who receive additional specialized training on a particular weapon system or equipment. ASIs authorized in the field artillery require 2 to 15 weeks of school training. In some cases, additional promotion points are associated with the additional skills.

The ASI should be entered in the soldier's records while he is at the school. Every supervisor and soldier has the responsibility to ensure that this training is entered in the soldier's military record. When training is not reflected, the local military personnel office can correct the error if the soldier provides a copy of the orders awarding the ASI, his diploma, or training completion certificate.

The personnel system cannot place the right soldier in the right job unless he can be identified. Identification of soldiers with special skills becomes increasingly important as the force modernizes.

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### MILPERCEN in Motion

Is there a better way to manage the distribution of the Army's people? The US Army Military Personnel Center (MILPERCEN) is going to find out during the next year, and field artillerymen will play a special role in the process.

Currently MILPERCEN personnel manage enlisted soldiers, warrant officers, and commissioned officers separately. Later this year a prototype Field Artillery Branch will assign all three groups as part of a year-long evaluation to determine if there is a more effective and efficient way to do the job.

Major General James R. Hall, the Commander of MILPERCEN, recently directed that a consolidated Field Artillery Branch become the prototype for the merger of the Enlisted Personnel Management Directorate and the Officer Personnel Management Directorate. Hall emphasized the purposes of this initiative are to enhance readiness, increase the quality service to the Army, and maximize the individual potential of soldiers.

Initially, people in the Field Artillery Officer Management Branch will move to the 6th floor of Hoffman I Building, to collocate with the managers assigned to the Enlisted Field Artillery Branch. The prototype Field Artillery Branch Chief will work for the directorates of both the Enlisted and Officer Personnel Management Directorates as well as for the Commanding General of MILPERCEN.

The field artillery branch prototype will begin operation early this year and will operate for at least 1 year. The purpose of the year-long evaluation will be to determine if consolidation of officer and enlisted branches leads to better management.

The prototype organization will control the distribution and developmental assignments of 44,539 soldiers; 6,302 officers; and 276 warrant officers in field artillery career fields.

Lieutenant Colonel Harry R. Yarger will lead the reorganization of the current field artillery personnel management system and the field artillery branch prototype office.



# Mass Casualties

## An Exercise in CSS

by Lieutenant Colonel Henry C. Beumler, MSC

The thunderous roar of a low-flying jet and a loud pop gave way to the quiet whisper of a silent, murderous mist. Coughing, choking cries for help, for medics, and for mother fill the tainted air. Confusion reigns supreme as the battery's leaders simultaneously alert higher headquarters, receive a fire mission, and hurry to treat the convulsing wounded.

### The Problem

In training combat arms units, leaders have traditionally concentrated on honing a rather parochial set of battle skills. They have given little thought to the horrific challenges associated with a massed casualty situation described above. This tendency is particularly pronounced in field artillery units which face a tremendous work load associated with the individual training of the howitzer crew members; section-level training

of survey teams, fire direction centers, and weapon crews; and in the collective training of battery and battalion-level organizations to the exacting Army training and evaluation program (ARTEP) standards.

The mission essential task list (METL) embodies the spirit of this logical yet parochial view. It emphasizes those areas necessary for the unit to deploy, fight, and redeploy. Expressed in terms of task, conditions and standards, the METL underscores the heart of the artillery mission—putting steel on the target.

Paradoxically, the METL is a blessing and a curse. It provides focus, but it also gives short shrift to those tasks combat units don't like to think about let alone *practice*. It avoids those areas with which Redlegs are unfamiliar—supply, maintenance, medical, and prisoner of war control. The cost of such oversights may well be chaos and defeat.

This problem is most acute in corps-level combat units where support functions are not as closely aligned or allocated as they are within divisions.

Often corps-controlled combat units train only peripherally on tasks featuring nuclear, biological and chemical (NBC) teams; medical evacuation; and damage assessment. Seldom is an entire battery or battalion challenged with other than gunnery-oriented training. There simply doesn't appear to be time for such niceties. What's more, combat support (CS) and combat service support (CSS) elements are so wrapped up in their daily personnel, maintenance, supply, and medical functions that it is impractical to take them to the field where they can function as components of a combined arms team. It is but a short step from this rationalization to the ludicrous, yet often expressed contention that support units will perform their mission in combat or under field conditions just as they perform them in a garrison environment.

Such systemic narrowmindedness is, of course, born of ignorance and stress. Field artillerymen do not understand how combat service support works and feel compelled to concentrate on what they conceive to be more important things. Unfortunately, their parochialism may prove fatal.

### A Solution

The prescription for such ills is a commitment to "train as we will fight." The efforts of Fort Sill,

Oklahoma's III Corps Artillery provide an excellent example of how units can tackle that tough job.

The first step is to reduce the ignorance of combat arms leaders. III Corps Artillery's leaders sought to solve this problem by having each of the local combat support and combat service support commanders explain their missions, unit organizations, and capabilities within the framework of AirLand Battle doctrine. The annual commander's conference provided an ideal forum to increase the Corps Artillery's overall knowledge of the integrated battlefield. The results were many raised eyebrows and a heightened awareness.

The second step translated talk into action. The Commanding General of III Corps Artillery directed that all ARTEP evaluations feature the full range of combined arms operations. The result was that field artillery battalions now sought the virtually constant support and attention of available combat support and service support organizations.

Engineers began to dig improved fighting positions, field hospital personnel started evacuating real and simulated casualties, and supply and service units fielded transportation and maintenance support during normal training events. Basic combined arms tasks soon gave way to more ambitious efforts—barrier and obstacle construction, river crossings, recovery operations, and mass casualty exercises. Combined arms training at the battalion level had come of age.

The first unit to attempt training on a truly large scale was the 75th Field Artillery Brigade. During its multi-unit ARTEP evaluations, the brigade employed soldiers and units from Fort Sill's combat engineer, supply and service, and infantry battalion, as well as from the author's field hospital.

## The Plan

Planning for the operation began with initial contact between the 75th Brigade S3 and the 214th Brigade S3 who controls all the III Corps Artillery's combat support and service support units. The two planners determined what assets were available and how they could best be used during the training. Soon after this initial contact, leaders from the combat service support battalions met with the 75th Brigade S3 to work out the details. The 47th Field Hospital planners, for example, agreed to provide the following range of medical support:



**Medics transfer a patient from a contaminated litter onto a clean one before they transport the wounded soldier to the hospital for additional treatment.**

- Certifying preparation of replacement for overseas movement qualification by screening health records and bringing immunizations up to date.
- Providing sick call in the field.
- Holding patients on quarters in the field.
- Providing emergency medical treatment for injured soldiers.
- Supporting and evaluating mass casualty exercises.
- Executing the evacuation of real and simulated patients by both air and ground ambulances.

Early discussions with the artillery commanders being evaluated indicated that they wanted their soldiers' medical records screened but did not want their troops to receive the required immunizations. They wanted all available soldiers to get the full benefit offered by the evaluation, not to be laid up as the result of the side effects of needed shots. This reasonable request resulted in medical teams screening all records and scheduling follow-up appointments for those soldiers who required immunizations.

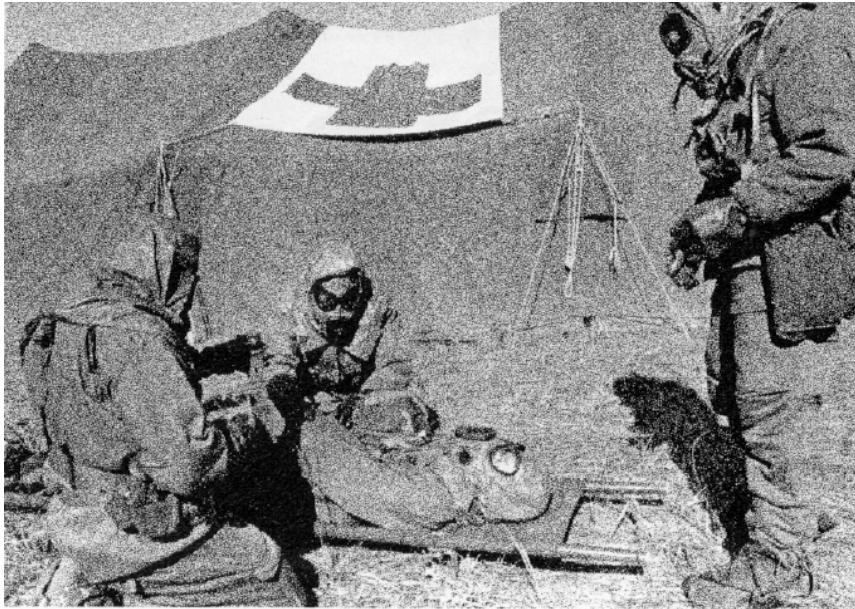
Providing medical treatment in the field presented another problem. Because there are no physicians assigned to field hospitals during peacetime, III Corps Artillery leaders requested that Fort Sill's medical activity provide doctors for the exercise. Early coordination with the medical activity (MEDDAC) resulted in one physician being detailed to the field hospital for the duration of the exercise despite the heavy garrison patient load being experienced at the time. The medical activity commander reasoned that treatment in the field for the two artillery battalions plus all other units deployed to the field would reduce the

number of patients being seen at the troop medical clinics and the station hospital.

The 47th Field Hospital accomplished the medical planning and task organizing of all medical assets. It actually fielded one complete, 100-bed hospital unit plus all ancillary hospital facilities including a laboratory, x-ray clinic, emergency room, and pharmacy. What's more, the battalion headquarters provided command and control to include medical evacuation via ground and air ambulances.

During the early planning, combat arms and service support leaders realized that the greatest potential benefit to be gained by the artillery units would come from a mass casualty exercise. By "killing or injuring" a substantial portion of a battery, the evaluators would force unit leaders to make many difficult decisions quickly. Casualty reports would have to be made and replacements requested by military occupational specialty. Damage assessments would have to be done and equipment requisitions forwarded. Moreover, junior leaders would have to reconstitute their organizations. These would be no small challenges to the Redlegs because few units had any sort of standing operating procedure (SOP) dealing with such contingencies.

Medical planners decided to evacuate simulated mass casualties to the field hospital which would process them through the hospital system and eventually return them to the brigade headquarters to fill the personnel requisitions from the battery which had suffered the attack. As planning progressed, the hospital's leaders realized that both battalions would have to incur mass casualties on the same day to



**Immediately following a chemical attack, medical personnel begin treatment of patients.**

keep the overall exercise on track. This meant that the hospital was really going to get a workout.

## The Event

At the appropriate time in the scenario, the brigade NBC officer and hospital commander pulled into Battery A, popped smoke simulating a chemical attack, and began to distribute 3 by 5 cards describing the symptoms of exposure to a nonpersistent nerve agent. The cards also gave medical personnel the information needed to sort and begin treatment of the patients.

As most knowledgeable soldiers would anticipate, Battery A's difficulties were significant. First, the battery's emerging leaders could not break through on the battalion radio net to inform their higher headquarters of the incident. The battalion tactical operations center was in the midst of an air assault operation and would not accept any irrelevant traffic. This proved a bad decision. Had they listened to the call and checked the current downwind message, they would have realized that the battalion headquarters was well within the downwind fan of the NBC attack and in danger of being contaminated. Battery personnel eventually made contact using land-line and requested medical assistance.

In the course of selecting casualties, the controllers had "killed" the battery NBC noncommissioned officer. That was a devastating choice. He was the sole available source of expertise with regard to the preparation of the NBC reports. Fortunately, the battery commander had

been out on a recovery mission at the time of the attack, and upon his return he immediately began to take actions to reconstitute the battery, render the appropriate reports, and continue the mission. He also supervised the evacuation of casualties by ground and air.

At the hospital, medical troops decontaminated, treated, and returned the casualties to the brigade headquarters. Total time from the initiation of the attack until the soldiers returned to the Brigade was approximately 3.5 hours. Of course, the time sequence was unrealistically short, but it did allow the medical personnel to prepare for the second event.

Battery B suffered the devastating effects of massive, accurate counterfire. Medical evaluators immediately moved in, identified the wounded, and began to mark casualties. Specifically, medics began their casualty designations with their howitzer crews and then moved out in all directions, selecting soldiers as patients, and applying moulages.

In Battery B the response from the battalion headquarters was immediate. Not only did the call get through, but within minutes the battalion commander, chaplain, S3, and organic medics arrived to assess the situation and lend assistance. Calls from the battalion to the brigade for medical assistance soon reached the hospital, and within 30 minutes from the initial strike the first air ambulance was loading patients. They evacuated all wounded including the battery commander within 1 hour of the strike, and the new commander began to reconstitute his battery.

## The Lessons Learned

An analysis conducted after the evaluations showed that all participants thought that the mass casualty exercise was a beneficial experience. It provided valuable, unprecedented training, and forced junior leaders to grapple with some difficult problems. It also gave staff elements including the S1, S4, and chaplain an opportunity to make important contributions to the operation. Moreover, it highlighted weaknesses in SOPs at all levels and increased everyone's awareness of the need for direct and constant coordination with combat support and service support elements.

The exercises had some unanticipated ancillary benefits. They forced battalion-level decision makers to handle requests for fire support in terms of mission priority, howitzer availability, and relocating the batteries. Furthermore, the exercises gave commanders an opportunity to see how junior leaders would perform in new jobs and under pressure.

## Conclusion

Combined arms exercises are a necessity if the Army is going "to train the way it will fight." We cannot expect soldiers to do the right thing and make the right decisions without training. The next battle will be fought by combined arms teams composed of combat, combat support, and combat service support organizations. By planning, coordinating, and training together now, these teammates can abandon their natural parochialism and avoid unnecessary anguish when the steel really begins to fly.



**Lieutenant Colonel Henry C. Beumler, MSC, is the Commander of the 47th Field Hospital, Fort Sill, Oklahoma. He has bachelor's and master's of science degrees from the University of Arizona and a master's in hospital administration from Baylor University. Lieutenant Colonel Beumler is a graduate of the Army Medical Department Basic and Advanced Officer Courses, Airborne School, Counter-Insurgency and Unconventional Warfare Course, and the Command and General Staff College. He has served in stateside and overseas assignments to include combat duty in Vietnam.**



# A Canned Exercise:

## The Combat Field Feeding Test

by Captain John A. Hamilton, Jr.

**T**he 25th Infantry Division Artillery recently participated in the combat field feeding test conducted by the US Army Combat Developments Experimentation Center (CDEC). During the evaluation, three artillery battalions tested both the new rations and the new equipment that may well revolutionize class I operations in the light division.

Specifically, the combat field feeding system test (CFFST) evaluated both the tray pack rations known as T-rations and the Meal, Ready to Eat (MRE). Medical experts gathered data from soldiers subsisting on the various ration cycles, while other US Army Training and Doctrine Command (TRADOC) and the Quartermaster School evaluators studied new equipment and various serving techniques.

The 25th Infantry Division artillerymen welcomed the chance to participate in these tests. They realized

that conversion to the three brigade, light infantry division structure necessitates changes in the delivery, preparation, and serving of food. The division's light artillery battalions are austere organizations which do not have the luxuries of dedicated mess trucks or battery mess sections. Nine cooks feed the entire battalion. The traditional A-ration-C-ration-A-ration cycle prepared by battery mess teams is simply not feasible in such light organizations.

### The Tests

The test allowed the Army to test some possible feeding alternatives. CDEC evaluators considered the options in three phases.

- Phase I took place on Oahu and included pilot testing and new equipment training for the 25th Infantry Division Artillery cooks.
- Phase II occurred during the

deployment of the Division Artillery to Pohakuloa Training Area during Exercise Opportune Journey 4-85. It was a 21-day test in which all participants consumed only those rations issued to them by their units.

- Phase III was a 25-day extension of the Phase II effort with four batteries remaining behind to continue testing while the bulk of the Division Artillery redeployed to Oahu.

Perhaps the toughest mission fell to the 1st Battalion, 8th Field Artillery Regiment whose gunners subsisted on a two MRE and one T-ration cycle (C-T-C). The battalion's Battery A also participated in Phase III testing. It then consumed nothing but a C-T-C cycle for 47 continuous days.

Other battalions had tough assignments as well. The 7th Battalion, 8th Field Artillery Regiment subsisted on



**Civilian data collectors record information during the serving of a tray ration.**

a T-C-T cycle. Two batteries from the 7th Battalion also took part in Phase III; one remained on the T-C-T cycle while the other used a T-C-T cycle with A- and B-ration enhancements. The 2d Battalion, 11th Field Artillery served as a control unit eating a conventional A-C-A cycle. The challenge faced by the 2d Battalion was preparing A-ration meals when staffed and equipped with only the personnel and equipment authorized under the light division design.

Each of the tested artillery battalions employed mobile kitchen trailers, company level field feeding kits (CLFFK), remote food carriers, sanitation centers, and canteen cup stoves. For the purposes of the test, two mobile kitchen trailers operating in tandem provided centralized cooking in the trains area. Company level field feeding kits allowed each battery to heat and serve their T-rations in the battery area. The

sanitation center was nothing more than a lightweight frame tent with three sinks, two work tables, and a drain table. Remote food carriers kept the tray packs warm after heating for delivery to remote locations, much as mermite cans do for A-rations. The canteen cup stove, which fits into the canteen cover, provided a handy platform to heat a canteen cup.

## The Results

- Meal, Ready to Eat. Cold MREs are often the standard fare in fast-moving artillery units. However, a sustained diet of cold MREs is tough even for the most die-hard Redleg. A small portion of tobasco sauce provided the only enhancement allowed during the test, and each soldier used the *25th Division MRE Cookbook*, compiled by Chief Warrant Officer Four James A. Sifford, to spice up the available fare. Most of the

modifications to the MREs involved mixing the main course with either the beans or potato patty and covering it with a melted cheese spread and hot sauce. Often, more hot sauce yielded better taste. Other possible MRE changes suggested by the test include the addition of sweetened drinks and the deletion of all dehydrated items.

- T-rations. The Army has structured the light infantry division to subsist on T-rations. The 10,700-man division will have only 229 cooks; therefore, consolidation of feeding operations at battalion level is a must. Using company level field feeding kits, a single cook can feed 200 soldiers in 3 hours. In a division configured for air transportability, that kind of flexibility is hard to match. The mobile kitchen trailers also allow the light battalions to retain a limited capability for A- and B-ration preparation. Of course, planners do not envision that the light battalion can sustain serving A-rations without personnel augmentation. They do believe that A-ration enhancements—fresh fruits, vegetables, and eggs—would be available.

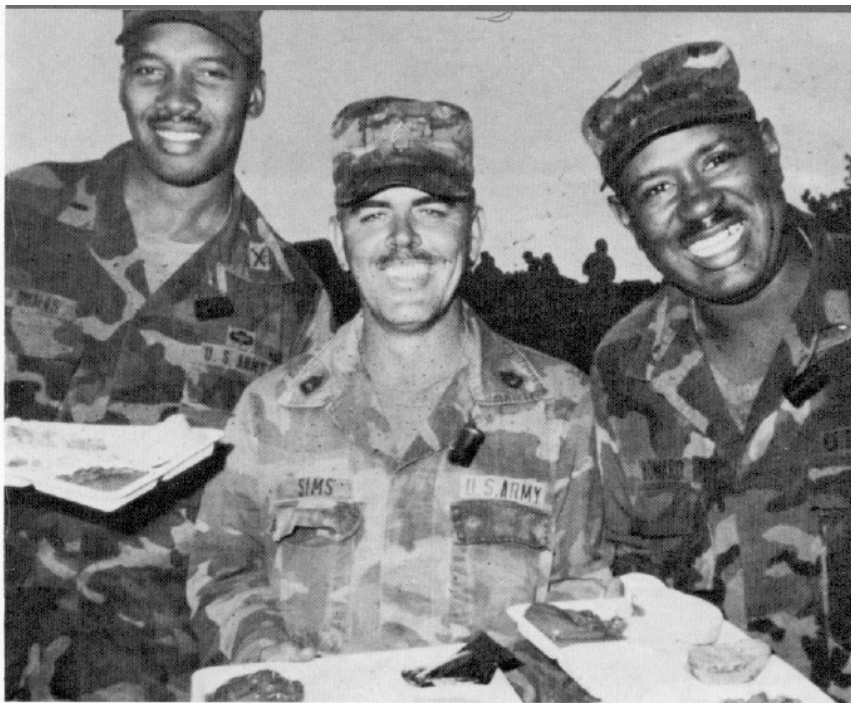
T-rations were unfamiliar to most of the test participants. They come packed in tray-shaped cans and contain a single entree in sufficient quantity to feed between 16 to 18 soldiers. Cooks prepare meals by immersing the trays in hot water. They then open the meals and serve them to soldiers on paper trays. When it is necessary to send T-rations to remote sites, cooks load the tray packs into a remote food carrier and transport them to their destination. The remote food carriers will keep rations warm for up to 4 hours. T-ration tray packs require no refrigeration and come with a fixed number of servings. Therefore, it is necessary to deliver a tray pack of each menu item to any remote location, even if there are only four or five soldiers at the site.

Troop acceptability of T-rations is difficult for the casual observer to gauge. All units consumed 3 or 4 days of MREs before receiving T-rations, and more than 1 cynic commented that anything would taste good after 9 consecutive MREs.

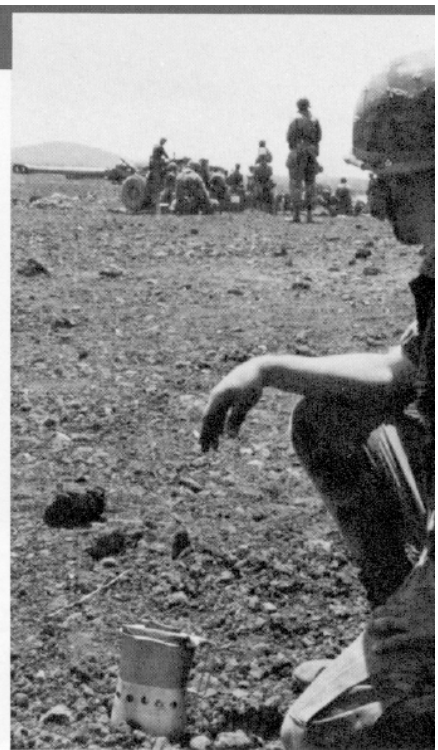
Certainly, one of the major concerns that surfaced during the test was the durability of the equipment. The remote food carriers proved hard to clean and warped easily. The durability of the mobile kitchen trailer carriage also caused problems; bolts and screws often worked loose.



**A field testing participant removes a tray ration from a remote food carrier.**



Eager participants await taste-testing of T-rations.



A field artilleryman uses his canteen cup stove to heat rations while observing M198 direct fire.

But when all things were considered, the battalions of the Automatic Eighth Regiment had little difficulty serving T-rations. The real challenge for those preparing T-rations came during the "surge feeding" portion of the test when the 7th Battalion prepared four consecutive T-ration meals for themselves and the 1st Battalion. Although some problems did occur, the test demonstrated that it is possible to serve 700 personnel using only one battalion's equipment if feeding locations were reasonably close together. Two of the major problems that did arise during this portion of the test were that presliced bakery bread disintegrated when transported and tray packs not heated for a full 45 minutes often were cold by the time they reached hungry units.

- A-rations. By all accounts, the cooks of the 2d Battalion, 11th Field Artillery had a much rougher time than their 8th Field Artillery Regiment counterparts. They had to turn out two hot A-rations a day while limited to light division equipment and manning. Sustained A-ration meals appear to be beyond the capacity of the light artillery battalion without outside augmentation.

### General Observations

The feeding concept of the light division is difficult for many artillerymen to accept. Artillery organizations have long prided themselves on the fine A-ration meals turned out by battery

mess teams as well as their ability to provide hot coffee and soup during long nights of firing. These luxuries may become a thing of the past in the air transportable light division.

Tray pack and other operational rations were not particularly popular with the Division Artillery's troops. A sustained diet of MREs and tray packs is quite a departure from garrison fare. What's more, the younger troops did not prove to be big coffee or tea drinkers; they preferred sweetened drinks instead. Breakfast bake, a virtually indescribable breakfast item, received widespread condemnation. Unfortunately, many items envisioned for T-rations were not available at the time of the testing. This situation contributed to the limited variety, particularly in the breakfast menus.


One opinion expressed time and again was dissatisfaction with the remote food carriers. Both the 1st and the 7th Battalions found that the plastic carriers warped easily and did not keep rations warm as long as predicted. Frankly, most members of the tested unit could see no advantage to remote food carriers over the more durable, more easily cleaned mermite cans.

### Conclusion

Although the primary mission of the 25th Division Artillery was to participate in the combat field feeding test, the deployment to the Big Island

of Hawaii provided an opportunity to accomplish solid field training. The 105-mm battalions underwent external Army Training and Evaluation Programs. The 155-mm battalion refined its expertise in M198 airmobile and split battery operations.

Captain Thomas A. Thompson, Test Team Operations Officer, noted that the test profited from frequent battery displacements. In fact, the batteries often out-ran the testers, but close coordination ensured that the test team was able to receive all the data it required.

In fact, the success of the 25th Division Artillery's deployment to Pohakuloa Training Area and its participation in the combat field feeding test ensured that the only thunder heard on the firing ranges was automatic-on time artillery and not the thunder of rumbling stomachs. 

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