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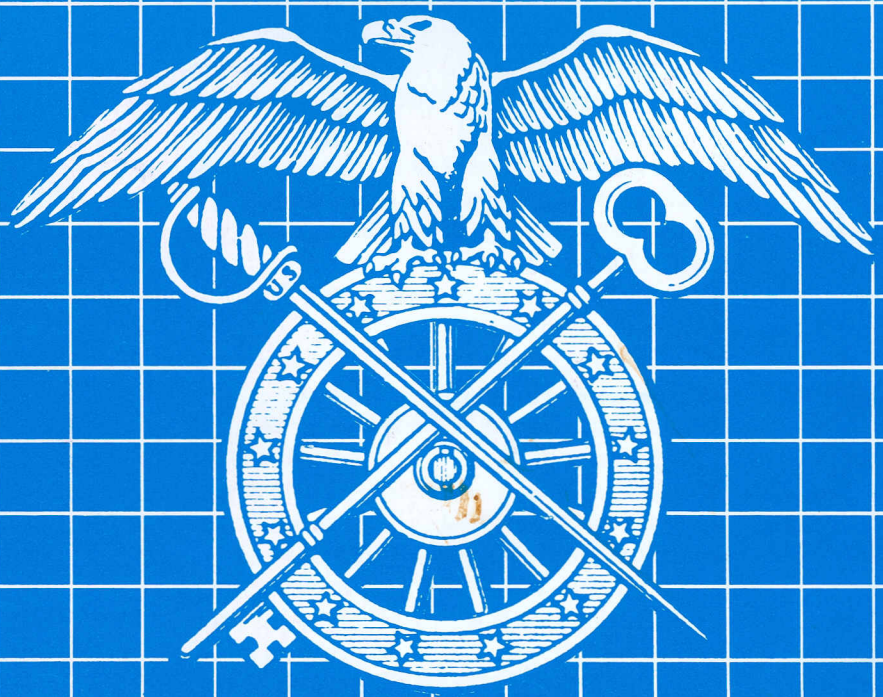

The Quartermaster Corps and the Future . . . A Blueprint for Change

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FROM THE EDITOR

Some of you may notice some subtle changes in the *QMPB* this edition. It is only appropriate, since the theme for this issue concerns change. Despite our involvement in the Middle East, the Army finds itself on the brink of another major restructuring. This restructuring will make us smaller, lighter, more agile and lethal. But how will the Quartermaster Corps change? This season's Special Feature section details some initiatives being explored by the Directorate of Combat Developments here at the U.S. Army Quartermaster Center and School. From aerial delivery to water support - times are changing. What you will find in the Special Feature section is only a glimpse of the future. One of the ways we can get some clues to the future is to look at the past. In **City Point: The Tool That Gave General Grant Victory**, CPT Robert O. Zinnen, Jr. looks at the massive Union supply operation during the Civil War at City Point (now Hopewell), Virginia. You may be amazed to find that descriptions of City Point sound like descriptions of today's supply operations in Saudi Arabia. In today's force structure, the lack of arctic equipment is a problem. In **Arctic Petroleum Operations: The Cold Facts**, CPTs William I. Rush and James R. Hamby relate their experiences as part of the 6th Infantry Division (Light) in Alaska and the improvements made in the Army's ability to support in extreme weather.

We have also included some "muddy boots" topics for you. There are some misunderstandings in the field about "Rear Battle." LTC Ronald G. Rada is the Chief of the Tactical Operations Branch, Concepts and Doctrine Division, U.S. Army Command and General Staff College. His article the **Evolution of Rear Operations Doctrine** is designed to eliminate the confusion over rear operations doctrine and terminology. An article on leadership rounds out the General Articles section. CPT Martin C. Dinan offers a view of what makes a good company commander in **Company Command: The Four Cs and Then Some.**

I mentioned change - the *QMPB* is in the middle of some change itself. We are trying to become a truly Corps-wide forum. To do this we need your help. As units change, deactivate or field new equipment, there is a knowledge base out there that others can use. From noncommissioned officers to officers, the lessons learned are out there. Tell us, we will let your voice be heard. I would also like to provide you with a "Letters to the Editor" section. Debates on better ways to accomplish the mission serve us all. The *QMPB* is more than willing to provide the forum.

Lastly, if there is anything the *QMPB* can do to serve **you** in the field, let us know. I intend to include a reader's survey in a future issue. But you do not have to wait for the survey. If there is something you want to see or something we can do better, tell us now.

-MPG

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Quartermaster
PROFESSIONAL BULLETIN

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ASTRA

Brigadier General Paul J. Vanderploog

A little over a year ago the Office of the Quartermaster General (OQMG) embarked on a program to better manage our officers who specialize in petroleum, subsistence and mortuary affairs. The program is called ASTRA - Assignment Specialization and Training. To date, we have made significant progress in getting the program recognized and implemented. This article will provide you with an overview of ASTRA and a status report on our progress to date. Simply put, ASTRA's purpose is to provide the Army with acknowledged authorities in the fields mentioned above and to ensure the officers in those fields have a well defined and competitive career life cycle. In terms of the ASTRA program we consider an acknowledged authority to be an officer who is recognized as a subject matter expert in his or her field by the military, academic and industrial communities.

We are looking for about 100 Quartermaster Officers, captain through colonel, to be included in the program. Selected officers will enter the program between their 5th and 8th year of service following branch qualification as a captain (Quartermaster Officer Advanced Course and successful unit command). As a first step, officers will be sent to advanced civil schooling and/or a training with industry assignment. The program will incorporate a continuing education program which will return ASTRA officers to school or industry as required. This will allow our officers to keep abreast of the latest technologies being explored by the industrial base and our universities.

Officers desiring to participate will be individually selected and managed by the Office of the Quartermaster General and U.S. Total Army Personnel Command and will normally fill only ASTRA designated positions. These assignments are located in TOE and TDA units, both in CONUS and OCONUS. It is important to realize that ASTRA assignments are almost exclusively staff-type positions and do not include command at the lieutenant colonel/colonel levels. However, command may be possible if the requirement requires a technical expert or the officer is selected in open competition. For planning purposes, command opportunities in either situation should be viewed as an exception rather than the rule.

Why do we need ASTRA? Over the years it has become obvious that our petroleum, subsistence and mortuary affairs officers are experiencing lower promotion rates than the total Quartermaster population. First of all, this means that some of our quality Quartermaster Officers careers lack opportunity to realize career aspirations. Secondly, and certainly as important, is the fact that the Army is losing technically trained experts. This is a bad return on investment for the soldier and the Army given the large expenditure of money and time sunk into education and professional development. Thirdly, we will not have true subject matter experts in our Corps to call on when critical missions such as Desert Storm require their capabilities. In fact, in the last several real-world combat operations, Urgent Fury in Grenada, Just Cause in Panama and now Desert Storm in Saudi Arabia, we have pulled functional experts out of the Quartermaster School, the reserve force and other critical locations to fill positions requiring expert knowledge at the division, corps, Army and joint staff levels. "Robbing Peter to pay Paul" should not and cannot be our standard way of handling contingency operations. We need to have a sufficient number of trained functional authorities serving in key positions throughout the Army to support contingency operations during their initial stages without being totally dependent upon the Reserve Component of the Corps.

One of the major reasons for the low promotion rates of our specialized officers is quite possibly repetitive assignments in their technical fields as they build knowledge and capability, not from a lack of good performance. As pointed out, specialized officers need to work in their field for more than the three- to four-year normal rotation cycle. However, in the past we have forced these officers to serve two masters. We

send them to back-to-back assignments in a specialized fuel job, for example, and then we send the officer to a mainstream Quartermaster functional or multifunctional assignment such as a Battalion S2/3, Support Operations Officer or Battalion Executive Officer. The aim is to provide the officer with a well-rounded background and hopefully increase his or her chances for promotion. Unfortunately, we more realistically have a group of officers who are qualified neither as specialists nor as functional or multifunctional Quartermasters. These officers' files appear, based on our review of statistics, to be less competitive for promotion than those officers who remain full-time in mainstream logistical jobs. Resultantly, the needs of the Army or our officers may not be properly served.

In my opinion, we cannot continue with this method of requiring our specialized officers to be experts in their field and to do all the other things a mainstream Quartermaster officer does. Simply, there is not time. Our Army needs and deserves a core of experts in petroleum, subsistence and mortuary affairs if we are to properly support the combat forces on today's battlefield and the battlefields of the 21st Century. The skills that ASTRA encompasses have become so sophisticated that a part-time officer simply cannot keep up with the state of the art and make intelligent decisions about the proper equipment, force structure, personnel and doctrine required to provide fuel, food and mortuary services on today's high technology, fast-paced battlefield.

ASTRA will provide our Army with a pool of highly trained, technically proficient officers who are acknowledged authorities in military, academic and industrial communities. In the last 12 months we have completed all the background staff work required to initiate the ASTRA program. The positions are identified; we have run the computer programs that define our ASTRA accession needs; the Quartermaster portion of the Department of Army (DA) regulation that covers officer management (DA Pamphlet 600-3) is drafted to reflect the ASTRA program; and we have received the endorsement of our Quartermaster General Officers. Additionally, we have briefed the Center for Army Leadership and the action officers at the Deputy Chiefs of Staff for Logistics and Personnel. Our final step is to brief and gain approval for ASTRA from the Deputy Chief of Staff for Personnel. We feel confident that ASTRA will be approved and that we will be able to initiate the program this summer.

I will keep you updated through this forum and by my direct communications with Quartermaster leaders serving worldwide. ASTRA will provide the Quartermaster Corps with the skills and experts needed to ensure we can continue to carry on our proud tradition as the "Sustainer of Armies."

BG Vanderploog is the U.S. Army Quartermaster General.

ASTRA

Means Experts in ...

- POL & WATER
- SUBSISTENCE
- MORTUARY AFFAIRS

Something Is Broken

CSM Milton B. Hazzard

In 1969 the Department of the Army authorized centralized selection boards to make recommendations affecting the careers of noncommissioned officers (NCOs). The principal tasks of these boards include recommending NCOs for promotion to sergeant first class, master sergeant and sergeant major; selecting NCOs for appointment to command sergeant major; reevaluating the records of NCOs who were in a zone of consideration but not reviewed for various reasons; reevaluating records in response to formal appeals in favor of or not in favor of NCOs; and identifying NCOs for possible early termination of military service under qualitative management procedures. Each board must produce a review and analysis. Voting members contribute to that report by commenting on the specific Career Management Fields (CMFs) for which they evaluated. The report is forwarded to the appropriate Department of the Army staff, the general officer responsible for a particular proponent, and major subordinate commanders. Information includes recurring strengths, weaknesses or other measurable factors that NCOs can use as a reference for self-development. The report also contains information that assists leaders with their mentoring responsibilities.

A comparison of review and analysis reports over the past few years reveals that the areas of failures or deficiencies are astonishingly redundant. Something is broken. A process attributed to Sergeant Major of the Army (SMA) Julius W. Gates can assist you in determining human failures in meeting standards and may lead to successful board evaluations. As SMA Gates points out: "When standards are not clear, not practical, or do not exist, that is Command Failure. When standards exist and the NCO does not know the standards or does not know how to achieve the standards, that is Training Failure. When standards exist and are known, but not enforced, that is Leadership Failure. When standards are known, the NCO has been trained to a level that should result in successful execution, the leader has provided all necessary support, and the soldier intentionally will not meet the standard, that is Individual Failure."

...the leader and the NCO being evaluated have a shared responsibility....

That is the point of this article: the leader and the NCO being evaluated have a shared responsibility to isolate, to the maximum extent possible, known or suspected problem areas; to determine probable human failures; and to take the appropriate corrective actions.

To the proud, high-performance warriors/supporters of the Quartermaster Corps, let us never fail to set, meet or exceed the standard. We are Quartermaster, Sustainer of Armies since 1775.

CSM Milton B. Hazzard is the Command Sergeant Major, U.S. Army Quartermaster Center and School, Fort Lee, Virginia.

Coming In The QMPB ...

In the next issue of the *Quartermaster Professional Bulletin*, we'll feature "Supporting Contingency Operations." Before Operation Desert Storm, the Army found itself concerned with the "hows" of supporting contingency forces. Recent experiences in Grenada and Panama highlighted both the positives and negatives of the current system. Although that focus is on hold, it has not disappeared. In the next issue, the Directorate of Combat Developments here at Fort Lee, VA, will provide the focus for our look into contingency operations. Several articles by Operation Just Cause veterans have also been submitted to the *QMPB*, and we expect to bring you several.

For those noncommissioned officers coming into the window for the Advanced Noncommissioned Officer Course (ANCOC) and Basic Noncommissioned Officer Course (BNCOC), the Noncommissioned Officer Academy has submitted an article which should answer some of your questions. And, of course, we'll have our regular Quartermaster Update section.

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AIRLAND BATTLE-FUTURE CHALLENGES

John D. Greaves III

Over the last half of this century, changes in threat and the geopolitical environment have allowed the Army to take an evolutionary approach to its restructuring. The changes of the last 18 months dictate that this approach will not allow us the response time necessary to react to quickly changing needs. Budget cycles, extensive testing and long procurement times determined when and if we would be initiating force modernization changes. Where we once took the almost casual approach of establishing buys that extended over a long duration and allowed industry to drive the schedule, the needs of the military services must now become the driving factor.

The evolutionary approach has become pervasive in many of the areas of defense and has worked fairly well in the Cold War environment. The current response to the needs of the supported force has resulted in excellent support to forward deployed forces. This is commendable in light of diminishing force structure and reduced resources. However, the way we currently do business just will not "cut it" on the future battlefield.

Where we are now responsive, we must become anticipatory. Support must be on the way to the next rendezvous point before we have finished the current support mission. Sitting on top of a pile of stocks and waiting for the customer to come and pick them up is not acceptable. Unit distribution will be the rule, not the exception. The same is true of the services that we provide. The sustainment imperatives (anticipation, integration, continuity, responsiveness and improvisation) that were imbedded in AirLand Battle doctrine will become even more of a challenge under AirLand Battle-Future. The capabilities of the distribution system will be stretched to the outer limits, and time distance factors must be overcome with innovative planning and improved communications. As the Army is built down, we must ensure that the force does not become dysfunctional and unable to support itself. We must have organizations that allow us to mass logistics assets to support an individual battle engagement and then quickly reorganize to respond to a new set of missions. The restructuring of logistical command and control units has begun. Nondivisional corps units will soon be designed to support the forward elements. The required support will be pushed forward to provide sustainment for the next battle phase. We must be able to tailor support packages much the same as combat units task force organize. The logistics commanders (starting at the company level) will have to quickly analyze mission requirements and task organize to adapt to the needs of the supported units. Long lines of vehicles from combat units rushing to the rear for resupply will belong to the past.

Recommended organizational changes in divisional units will impact heavily on the responsibilities of the logistician. The "unweighting" of maneuver units by lessening their logistical "tail" will significantly increase the workload and span of operations for forward support battalion commanders and their corps counterparts operating forward of the division rear boundary. Corps support command units that have been regarded as performing a backup role in the past are now committed forward and will provide the combat forces with the resiliency required to continue the fight. This situation is further compounded by eliminating the main support battalion. As brigades become more autonomous on the nonlinear battlefield, the support elements must assume a closer relationship with maneuver elements. This will be the key to anticipating early enough to achieve the necessary reaction time.

The primary emphasis in changing the way the Army does business is to build the leaders who are capable of carrying out the multiplicity of tasks over longer lines of communication. These leaders must be able to conduct multidimensional and multifunctional operations far forward on the battlefield (at or near the forward line of troops) and, simultaneously, plan for anticipated mission requirements for reconstituting a unit in the rear.

Change is inevitable. Our challenge is to seize control of the processes that drive the change and ensure that these processes are responsive to the needs of the Army.

John D. Greaves III is a Senior Military Analyst at the Directorate of Combat Developments, U.S. Army Quartermaster Center and School, Fort Lee, Virginia. He holds a bachelor of science degree from Indiana University of Pennsylvania and a master of science degree from Florida Institute of Technology. He is also a graduate of the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas.

AIRLAND BATTLE

SUPPORTING AIRLAND BATTLE-FUTURE

James S. Emery

Times are changing. The Berlin Wall has come down. East and West Germany have been reunited. The Soviet Union and the rest of the world are working together to control the aggression of Iraq in the Middle East. The Soviets are shifting to a free market economy with more emphasis on strengthening the economy than on the warfighting apparatus. The threat, as we have known it for 40 years, has changed.

In addition to changes in the threat, other changes will impact on Army concepts and doctrine in the coming years. See Figure 1 (Army of the Future Trends).

The size of our Army will be reduced significantly over the next several years, not only in total numbers but also in the actual numbers of units on the ground. Since the land areas in which we expect to fight will remain the same size, we must develop a warfighting concept that will allow us to cover the same amount of terrain with fewer troops and units.

AirLand Battle has been the Army's warfghting doctrine for approximately 10 years. In order to cope with the many changes we are facing today, the U.S. Army Training and Doctrine Command has begun to develop a future warfighting concept called AirLand Battle-Future. This new concept will capitalize on three primary areas:

- Nonlinear warfare.
- Finding and fixing the location, size and structure of the enemy force.
- Long-range lethality of modern weaponry.

The new warfighting concept will avoid defensive, linear battles that result in grinding attrition of our forces. Instead, the new concept will focus on early detection of the enemy force and on the attrition of that force through long-range, accurate, deadly weapons. When the enemy force has been sufficiently reduced in numbers, the maneuver force will be committed. Until this time, the maneuver force will have been held in dispersed, protected corps enclaves rather than along a distinct forward line as in the past. This maneuver force must be able to move quickly and strike with lethal force, fighting an offensive battle that will last from 10 to 24 hours before a break in the action. This break in the action will be a recovery phase when we expect to complete most resupply and maintenance.

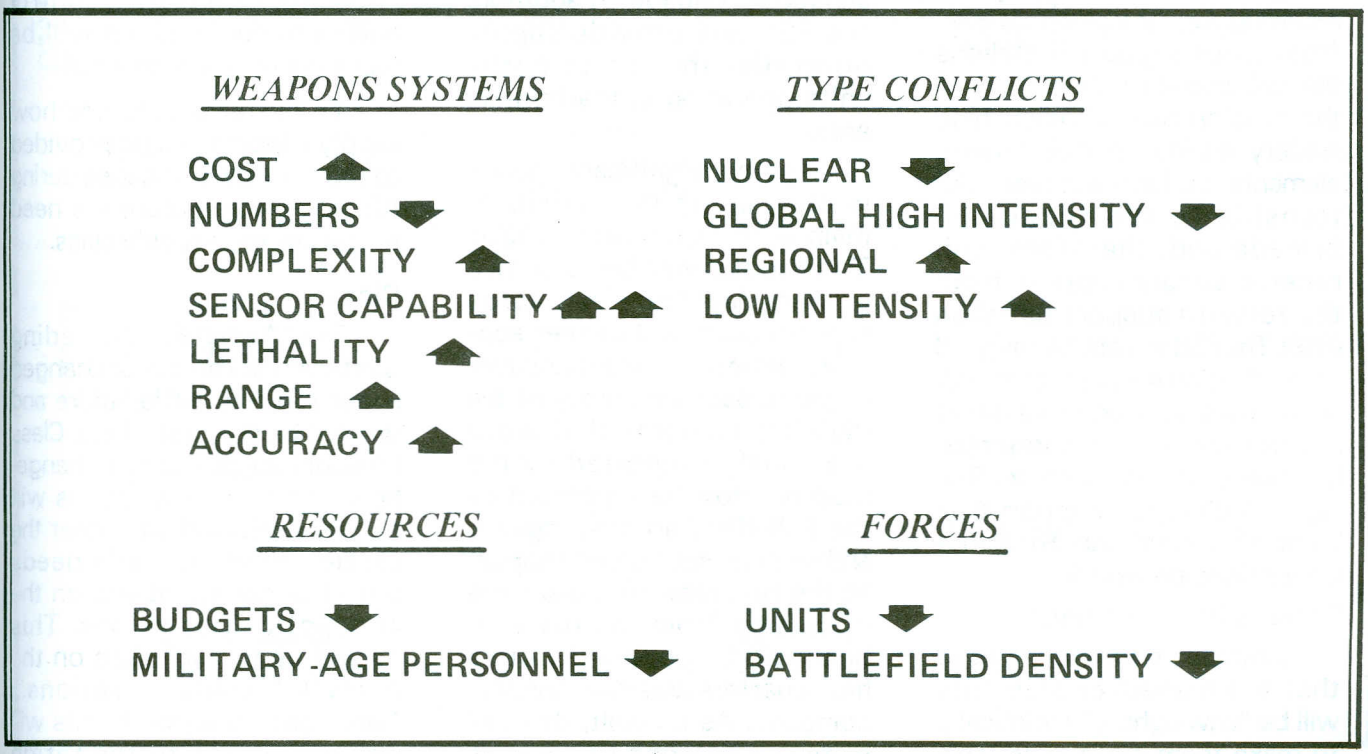

Figure 1. Army of the Future Trends

Supply Support Change

This new warfighting concept dictates a change in providing supply support on the battlefield. The remainder of this article will deal with the supply implications of AirLand Battle-Future that are being shaped by the U.S. Army Quartermaster Center and School and the U.S. Army Combined Arms Support Command (Provisional) (CASCOM) at Fort Lee, VA. The focus will be on the heavy division. Corps units will now play a greater role in support, and divisional units will also be structured to properly support the AirLand Battle-Future concept.

Several major changes will impact significantly on supply operations. The first major change will be maneuver brigades receiving supply support directly from corps support battalions that will operate in the vicinity of the division rear. Division field artillery, engineer and air defense elements will have a closer relationship to the supported brigade and, therefore, will receive supply support from the forward support battalion (FSB). The FSB will still be assigned to the division support command, but will have a closer, more direct relationship to the supported brigade than ever before. See Figure 2 (Forward Support Battalion Organizational Structure Under Consideration).

'Unweighted' Element

Another major change is that the maneuver elements will be "unweighted" logistically to make them more agile. This means that they will no longer have the ability to provide their own internal supply distribution. Most of the supply and transportation assets that were a part of the maneuver battalion support platoon will be transferred to the FSB. The FSB will then be entirely responsible for unit distribution of supplies to all elements of the brigade. This change alone will ensure that a "close and personal" relationship will exist between the FSB and the supported brigade. In addition, the FSB will provide supply point distribution to corps units operating in the brigade area.

... maneuver elements will be 'unweighted' logistically to make them more agile.

Another significant change is eliminating the division's main support battalion (MSB). This decision was based on two primary factors. First, corps support units will deliver supplies directly to the maneuver brigades. Secondly, many of the division elements that were previously supported by the MSB will now be supported by the FSB (field artillery, engineer and air defense). Supply support to the few remaining elements operating from the division base will be provided from a headquarters and main support company. As a result, this will eliminate layering of supplies in the division support area.

BSA Split

Another major change evolved because of the longer distances for operations under AirLand Battle-Future. The brigade support area (BSA) will now be split into a BSA Forward and a BSA Rear. The BSA Forward will be located anywhere from 10 to 30 kilometers from the weapon systems being supported. The BSA Rear will be located approximately 50 kilometers behind the BSA Forward. Command, control and communications will be more important than ever!

To better understand how supply support will be provided to the maneuver brigades during AirLand Battle-Future we need to discuss each supply class.

Class I

The Army Field Feeding System will remain unchanged under AirLand Battle-Future and will not be discussed here. Class I (ration) support does change, however. Basically, rations will be pushed forward to meet the tactical commander's needs based on his intent and on the concept of operations. This allows us to capitalize on the Army's "family of rations." Corps general support units will deliver rations to the ration points operated by the FSB in

the BSA Forward and Rear. The FSB will then deliver **operational** rations to the trains location of maneuver companies. Transportation to deliver rations forward will be provided by the FSB's combat transportation company. Unit rations, such as tray packs and Class A rations, will be available at the ration points in the BSA Forward and Rear. Since the maneuver units will retain their food service personnel and equipment, the requesting unit will be responsible for picking up these types of rations when the situation allows preparation.

Class II, Packaged III, IV and VII

Class II (general supplies), packaged Class III (petroleum, oils and lubricants), Class IV (construction and barrier materiel) and Class VII (major end items) will no longer be held in large quantities in the division area. The FSB will provide only limited support in these classes of supply. Supply support will be provided primarily by corps support units that will deliver directly to the requesting maneuver unit. The FSB will have a very limited capability for handling and transshipping these supplies, so delivery by corps support units in unit configured loads is an imperative. The FSB will operate a Class II, packaged III, IV and VII supply point out of the BSA Rear. However, this supply point will be quite small and capable of handling a few, emergency-type supplies such as some of the critical lubricants for the larger weapons systems.

Bulk Class III

Bulk Class III will be delivered from corps support units directly to the FSB in the BSA

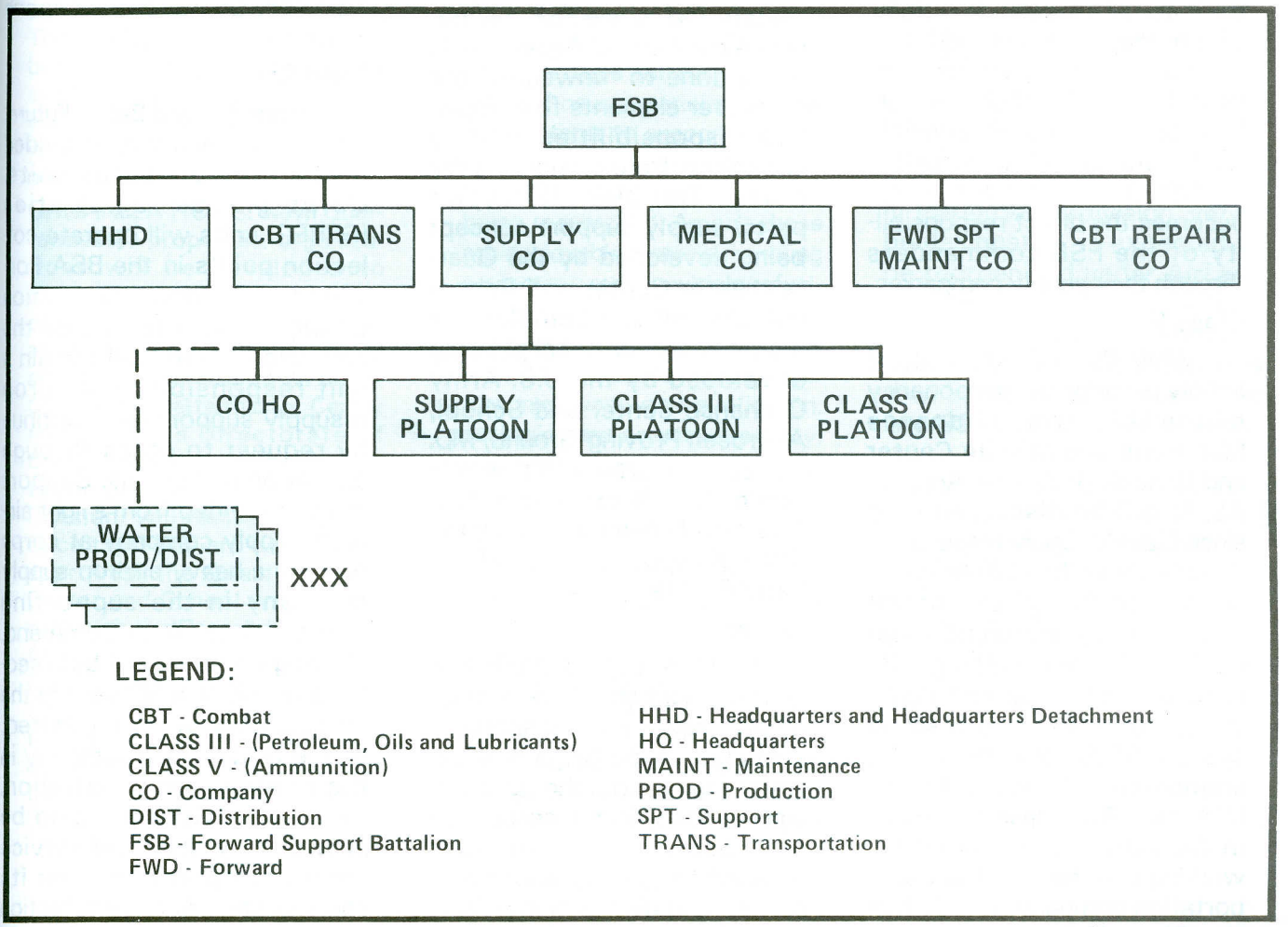

Figure 2. Forward Support Battalion Organizational Structure Under Consideration

Rear. Delivery will be by the most economical means available—pipeline, barge or rail if possible. If not, then corps tankers will deliver bulk Class III.

In the BSA Rear the product will be transferred to 5,000-gallon tankers operated by the FSB. When required, the FSB will move the product to the BSA Forward where it will be transferred to FSB-operated heavy expanded mobility tactical truck (HEMTT) fuelers. Based on coordination with the supported battalions, the HEMTT fuelers will move forward to refuel the weapons systems in their actual forward locations. The maneuver units will only maintain a small, emergency refuel capability. Under AirLand Battle-Future, responsibility for the complete refueling of the maneuver elements becomes the direct responsibility of the FSB commanders through their supply companies.

Class V

While Class V (ammunition) supply is under the proponency of the U.S. Army Ordnance Munitions and Missile Center and School, Redstone Arsenal, AL, it will be discussed here since Class V supply responsibility falls under the FSB. Ammunition will be configured into unit loads at corps ammunition support units supporting the brigade. Corps support units, using the palletized loading system (PLS), will move the ammunition forward to the BSA Rear. The Class V platoon in the FSB supply company, working with the combat transportation company, will deliver the Class V forward to the maneuver elements and assist in loading it directly into the weapons system.

Class IX

Under AirLand Battle-Future all maintenance for the maneuver brigade will be performed by FSB maintenance companies. The maneuver units will be responsible only for operator maintenance which is primarily preventative maintenance, checks and services (PMCS). Other than a few, critical, onboard spares, the maneuver unit will not handle repair parts. The mechanics previously assigned to the maintenance platoon of maneuver battalions will be transferred to the FSB maintenance companies. Again, this is being done to "unweight" the maneuver elements from logistics responsibilities so they can concentrate on fighting the battle. The Class IX (repair parts) supply support concept being developed by the Quartermaster Center and School will parallel and complement the maintenance concept being developed by the U.S. Army Ordnance Center and School, Aberdeen Proving Ground, MD. (A separate article in this edition of the *Quartermaster Professional Bulletin* discusses the Class IX support under AirLand Battle-Future.

Water

Under AirLand Battle-Future all water support will be provided by corps. If a water source is available in the brigade area, water teams from the field service company in the corps support battalion will be sent forward to operate water production and distribution points, delivering water to the maneuver elements. If a water source is not available, water will be delivered to the brigade from a corps general support water company using corps transportation. Currently, our water distribution system relies on the use of semitrailer mounted fabric tanks (SMFT). This system has many limitations to overcome to provide unit distribution of water under AirLand Battle-Future. The Quartermaster Center and School combat developers are currently exploring water distribution alternatives, such as packaged water and small, hard wall water tankers, which will allow water distribution forward to the weapons systems.

Field Services

Under AirLand Battle-Future, field services will be provided primarily from corps units. Corps graves registration (GRREG) units will operate collection points in the BSA Forward and BSA Rear. Evacuation of the remains to one of the collection points will remain a unit responsibility. Airdrop resupply support will continue by request to corps through operational channels. Support will be provided from a light airdrop supply company at corps or from a heavy airdrop supply company in the supporting Theater Army Area Command. Clothing exchange and bath sections will be sent forward to the brigade area, when requested, by the field service company in the corps support battalion. Laundry services will also be provided by this field service company operating from its corps location. Salvage collection is classified as a field service, but the function will actually be per-

formed in the same manner as it is now. Clothing and light textile renovation will probably be performed, when required, by host nation contract support.

Important to note as we go through this change is that once this concept is approved for implementation, it will have significant impacts on the Quartermaster Corps. Five major areas will be affected. These areas are doctrine, organizations, leader development, materiel and training.

- DOCTRINE: Numerous Quartermaster doctrinal as well as tactics, techniques and procedural manuals will require updating. This will be the primary responsibility of the Quartermaster Center and School's Directorate of Training and Doctrine with the actual writing in the academic departments.
- ORGANIZATIONS: New Quartermaster proponent organizations will be developed to properly support the new concept. This will require both new and revised tables of organization and equipment (TOE) to be developed. The Quartermaster Center and School's Directorate of Combat Developments (Organization and Personnel Services Division) will revise the TOEs. Once the TOEs are written and approved, the Quartermaster Center and School will coordinate with the Department of the Army's Office of the Deputy Chief of Staff for Military Operations and Plans (DA ODCSOPS) to ensure resourcing the new units in the Army force structure through the Total Army Analysis (TAA) process.
- LEADER DEVELOPMENT: Quartermaster leaders of the future will require a broader knowledge of how the Army in the field operates as logistics units become even more multifunctional in nature. Increased understanding of the supported unit's mission, as well as tactics, will be essential to correctly understand the commander's intent and anticipate logistics support requirements. Producing skilled, multifunctional, logistics leaders who are capable of operating in close harmony with supported combat units is an imperative.
- MATERIEL: The Directorate of Combat Developments (Materiel and Logistics Systems Division) is responsible for the development of new materiel and logistics systems to support AirLand Battle-Future and the Army in the field. Several areas are currently being researched. Among these are deployable material handling equipment; rapid, multiple refueling capability; lightweight ballistics protection; improved rations and ration preparation capabilities; improved water purification, packaging and delivery capability; survivable resupply and refuel vehicles; and a standardized storage and transfer system.
- TRAINING: Quartermaster Center and School programs of instruction (POIs), lesson plans, Soldier Training Publications (STPs), skill qualification tests (SQTs), Army Training and Evaluation Program/Mission Training Plans (ARTEP/MTPs) and other related training materials must be updated with the new and revised skills emphasized under AirLand Battle-Future. The required changes are the responsibility of the Directorate of Training and Doctrine with major support from the academic departments. Some of the common skills that will require more emphasis for every Quartermaster as a result of AirLand Battle-Future are map reading/ land navigation, communications, small unit defensive tactics, recognition of enemy vehicles/equipment, Infantry/ Armor battalion and brigade tactics (in order to anticipate supply requirements), and route security, to name only a few.

How close are we to actually implementing AirLand Battle-Future? It is closer than you may have thought. If all goes as planned, the concept should be approved by the time this article is published. We can expect implementation guidance shortly thereafter. A division, yet to be designated, is expected to be reorganized under AirLand Battle-Future TOEs in early 1992. After an intensive training period, validation tests will then be conducted, probably in late 1992 and early 1993.

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INDIVIDUAL SOLDIER WATER PURIFICATION SYSTEM

MAJ Bobby R. Templin *Joseph G. Aldrich*

One of the most critical items a soldier needs for survival on the battlefield is safe drinking water. The future battlefield will require rapid movement by dispersed forces confronting a variety of threats. Because of this scenario, many soldiers may not receive the quantity of Quartermaster-produced water required to be effective. This is particularly true during the early stages of deployment, on independent operations or if the supply system is disrupted.

The individual soldier may have to forage for water. In most cases, the only water readily accessible is surface water from rivers, streams, lakes and coastal areas. These water sources generally contain disease-causing microorganisms and may be contaminated by industrial pollutants and, on the modern battlefield, nuclear, biological, chemical (NBC) contaminants. Often, the only water available to the soldier will be brackish or saltwater.

The current solution is the iodine tablet, the most available means of water purification to the individual soldier. It will only provide limited disinfection capability and requires a minimum of 20 minutes from start of treatment to the time a soldier can drink the water. The iodine tablet also leaves an objectionable taste after treatment. Obviously there is a need for a better method. The U.S. Army Quartermaster Center and School, Fort Lee, VA, has assumed the lead in a cooperative program with the John F. Kennedy Special Warfare Center, Fort Bragg, NC, and the U.S. Army Infantry School, Fort Benning, GA, to provide the soldier an improved way to produce safe drinking water. The objective is to find a water purification system of chemical or mechanical components that will render harmless a wider range of disease organisms than iodine tablets. Plans call for a system to be progressively improved to desalinate and remove pollutants and NBC contaminants. The resulting water must also meet the strict guidelines imposed by the medical community.

The individual soldier may have to forage for water.

As part of an overall Army effort to improve individual soldier equipment, the new lightweight, low-cube water purification system could be fielded by 1995 as a clothing and individual equipment item. Numerous commercial and foreign military items are being produced and marketed which may meet the Army's requirements. The U.S. Army Natick Research, Development and Engineering Center at Natick, MA, and Belvoir Research, Development and Engineering Center at Fort Belvoir, VA are actively investigating those items. One such item is a tablet which chemically binds suspended material in the water and causes it to settle out. Another system uses a chemical exchange method designed by the Israelis to produce drinkable water from bacterial and NBC contaminated water. Other systems use mechanical filtration and disinfection techniques. The system selected may be one or a combination of the chemical or mechanical purification processes.

The media coverage of Operation Desert Storm has chronicled the critical importance of adequate water supplies. Water requirements are now being met through the field water system operated by Quartermaster units and host nation support. Should a soldier be isolated from this support, safe drinking water will be unavailable. Although many water sources exist, the water at these sources is too brackish to drink. The development of the individual soldier water purification system will ensure that safe drinking water is always available to the soldier, wherever the area of operation.

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Upgrading the 600-GPH ROWPU

John L. McCabe *CPT David M. Thomas*

> ***"You may talk o' gin and beer***
> ***When you're quartered safe out 'ere,***
> ***An' you're sent to penny-fights an' Aldershot it;***
> ***But when it comes to slaughter***
> ***You will do your work on water,***
> ***An' you'll lick the bloomin' boots of 'im that's got it."***
>
> *GUNGA DIN* by Rudyard Kipling
> British soldier in Afghanistan, c.1880

Effective logistical support equals combat power and often determines the outcome of battle. In an era of shrinking procurement dollars, the Quartermaster Corps of the future must spearhead a more economical approach to improving logistical support capabilities. Resources must be used wisely to ensure meeting the combat-critical needs of the soldier. The U.S. Army Quartermaster Center and School, Directorate of Combat Developments (DCD), is using this philosophy in an effort to maximize the Army's ability to provide drinking water on the battlefield. Each soldier in a desert setting requires approximately four gallons daily to maintain optimum combat readiness. It is a fact that water, not food, is the limiting factor for sustainment of a desert force. The 600-gallon per hour (GPH) reverse osmosis water purification unit (ROWPU) is the Army's primary water purification "workhorse" at the divisional level. It uses reverse osmosis (RO) membrane technology during the water treatment process. Raw water is pumped through a series of filters that remove the larger impurities. The RO membranes are part of the final screening process which removes the smaller impurities and dissolved solids from the water. Chlorine added in the final step makes the water fit for human consumption.

The 1,500-GPH Engineer Research Development Laboratory (ERDLATOR), which uses diatomite filters to screen impurities from fresh water sources, preceded the 600-GPH ROWPU. Although the 600-GPH ROWPU was fielded in 1981, most modern armies continue to use water purification equipment based on the diatomite filter technology of the ERDLATOR.

The major shortcoming of diatomite filter screening is its inability to produce fresh drinking water from saltwater sources. This deficiency compelled the Army to seek new technology that would allow field units the flexibility of quick deployment to remote areas that lack freshwater sources. This search led to a decision in the mid-1970s to develop a new generation of water purification equipment based on RO technology. At present, the U.S. Army is one of the few major defense forces using the RO-based water purification equipment that can purify freshwater from saltwater sources. In the late 1980s, unverified field reports indicated that the 600-GPH ROWPU could operate at higher pressures, resulting in freshwater capacity that averaged over 900-GPH. The major concern was that operating the ROWPU at such a high rate for extended periods might degrade the reliability, maintainability or supportability of the system. As the soldier's representative, DCD personnel had to ensure that the ROWPU's failure rate and maintenance burden did not increase as a result of the greater operating pressures. Other concerns were increased use of filters, repair parts or other consumable items as a result of operating at the higher 900-GPH rate for an extended period of time. Upgrading the 600-GPH ROWPU to 900-GPH became an important issue since this increased capacity would eliminate the current water production shortfall in divisional units. If the 900-GPH rate could be achieved and sustained with no perceptible changes in system support, the 50 percent increase would represent a terrific improvement in combat capability while keeping operating support costs near current levels.

The combat developer, represented by DCD, and the materiel developer, represented by the U.S. Army Belvoir Research, Development and Engineering Center (BRDEC) at Fort Belvoir, VA, confirmed these reports through a 1,000-hour field demonstration. This demonstration took place from 24 July through 14 August 1990 on the Appomattox River at Fort Lee, VA, using three 600-GPH ROWPU units. Researchers conducted the field demonstration with 77W (Water Treatment

Specialist) operators from the 6th Transportation Battalion, ROWPU Barge Team, Fort Eustis, VA. These soldiers operated all three units around the clock with 20 hours per day devoted to water production and the remaining four hours allocated to system maintenance. Each 600-GPH ROWPU averaged a production rate in excess of 900-GPH during the 1,000-hour field demonstration.

Only two hardware failures occurred in the system during the field demonstration of the three units. This low number is well within the acceptable range and represents no appreciable deviation from normal 600-GPH ROWPU operations. Based on this demonstration, the reliability and maintainability of the 600-GPH ROWPU showed no substantial decline when operating at a 900-GPH rate over an extended period. Preliminary results also indicate no apparent loss of performance or support.

Due to the success of the field demonstration at Fort Lee, BRDEC is evaluating the possible reclassification of the 600-GPH ROWPU to a 900-GPH ROWPU. This reclassification effort demonstrates an effective and cost-beneficial way to improve system productivity and performance. It is quite expensive to build a new soldier support system from scratch through a full-blown research and development strategy.

Materiel changes to existing systems are also a high-dollar approach to force modernization. It makes sense to take a hard look at improving existing logistical support systems by pushing the current hardware to its technical limit. This does not mean increasing production at the expense of system safety, supportability or other crucial factors. Lean procurement budgets are going to be a fact of life for the Quartermaster Corps of the future. We must look closely at the performance characteristics and operating procedures spelled out in our technical manuals to ensure that production is at the rated hardware limit. Enhancing hardware capabilities with revisions to technical manuals instead of materiel changes will spell tremendous cost savings to the Quartermaster Corps of the future while yielding a significant combat multiplier for our soldiers on the battlefield.

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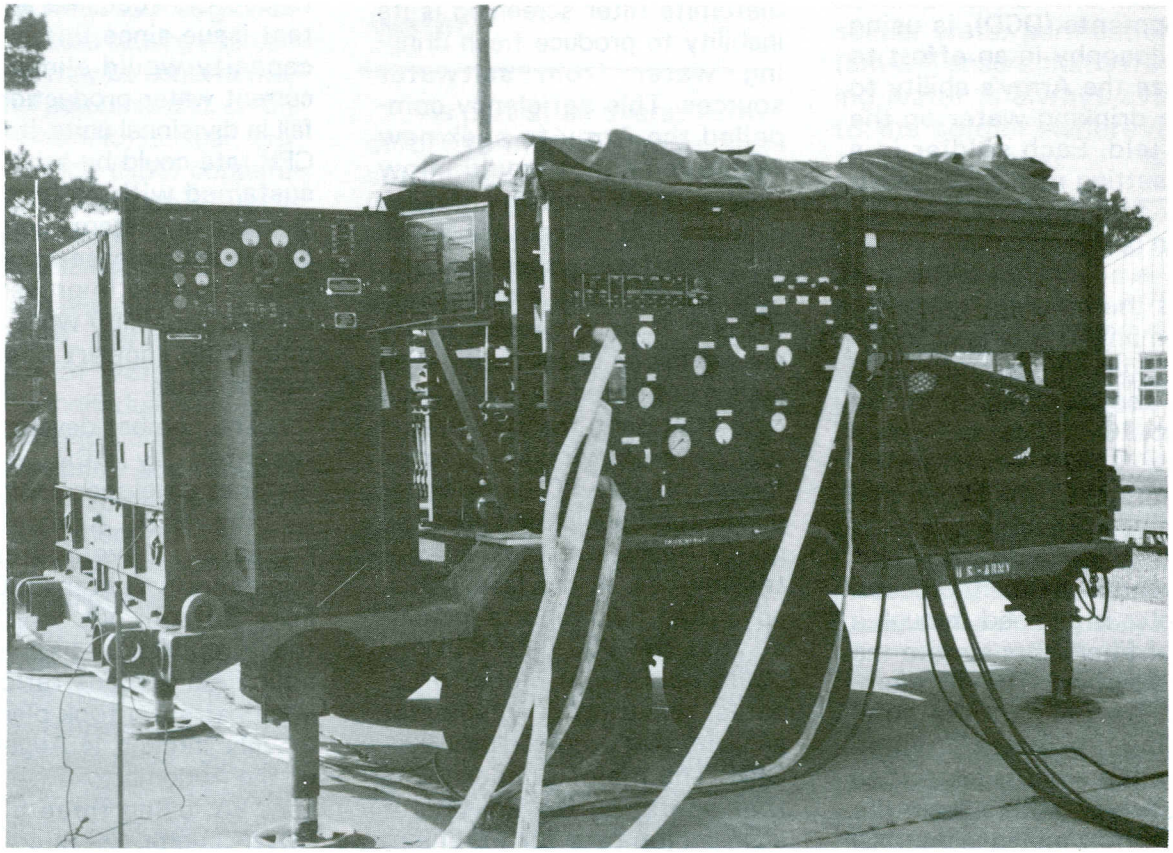


600-Gallon Per Hour (GPH) Reverse Osmosis Water Purification Unit (ROWPU)

LAUNDRY AND SHOWER SUPPORT

Donald R. Lynn *Joseph G. Aldrich*

Rapid movement supporting low-to high-intensity operations will characterize the future battlefield. New sophisticated weapons, modern vehicles, personal equipment and improved uniforms make the requirement for shower and laundry support more critical and difficult. The new Quartermaster Field Service Company must be more responsive and capable of centralized and decentralized operations to provide laundry and shower services that will benefit the soldier by increasing morale, health standards and personal hygiene. Improving these field services requires better equipment, institutional training and follow-on unit sustainment training.

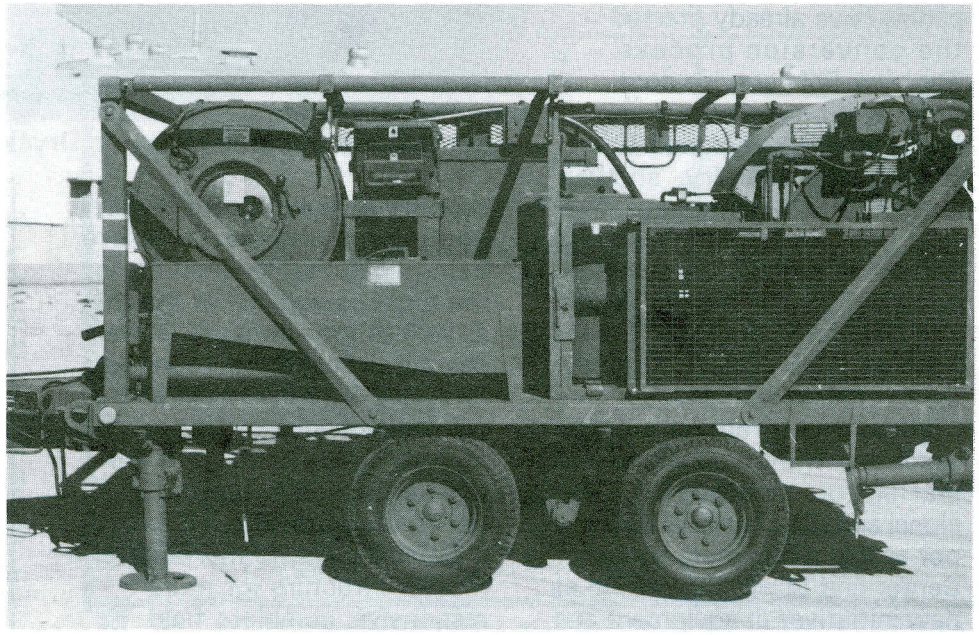
Laundry Systems

The U.S. Army Quartermaster Center and School at Fort Lee, VA, and the U.S. Army Natick Research, Development and Engineering Center at Natick, MA, have already begun upgrading trailer-mounted laundry systems. Adding a new 10-kilowatt diesel generator and separate extractor and improving the dryer and water heater increase reliability and help achieve a required 120 pounds-per-hour production rate. The improved laundry system, mounted on a tandem wheel trailer, is called the M85 Laundry Trailer. To further improve the M85, a water reuse system is being developed to save 2,000 to 3,000 gallons of water a day per laundry trailer. This will aid in environmental control of waste water and significantly reduce water requirements. The water reuse system saves the last two rinse waters and recycles rinse water as the next wash cycle water. Some of the water reuse systems have been applied to the M85s to support Operation Desert Storm. The M85 laundries should replace all of the old M532 systems in the field by the end of 1992 or mid-1993. There are two models of the M85 laundries, the M85 and the M85-100. The M85-100 model has a different washer, improved washer card reading control system, improved burner operation for the dryer component and minor modifications to improve the operator's work area.

The Quartermaster Center and School's newest initiative is to develop a nonaqueous ("dry" cleaning) laundry system to eliminate water in laundry operations. That system is called the Laundry and Decontamination Drycleaning System (LADDS). The LADDS currently uses Freon 113 as the cleaning solvent. Freon, identified as harmful to the Earth's ozone layer, will be replaced by a safer solvent in the future. The solvent will be contained in a closed-loop system and recycled for indefinite use. The LADDS will increase laundry production to 170 pounds per hour while decreasing operator tasks. Finishing the complete cleaning cycle in the same drum eliminates inter-system transfers of clothing. Technical testing at Yuma Proving Ground, Yuma, AZ, and Aberdeen Proving Ground, Aberdeen, MD, ending in December 1990 checked out equipment design and reliability. The current developmental and testing schedule projects fielding the LADDS in FY 96-97.

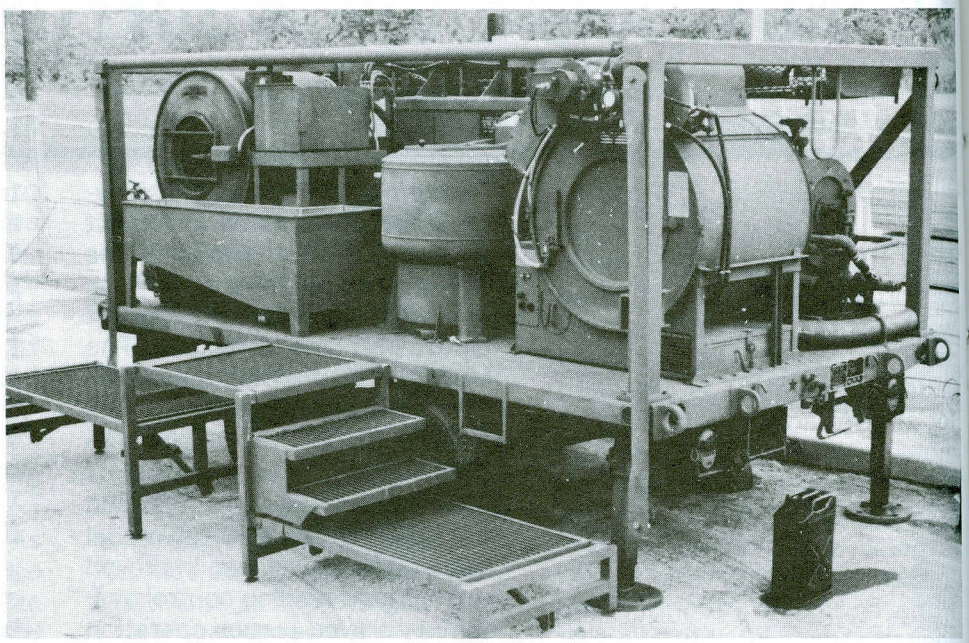
Bath Systems

The nine-head shower is the Army's newest design to replace the eight-head shower. The nine-head has an increased daily capacity, soap holders for the soldier and individual on/off controls to help reduce water consumption. It uses approximately 1,100 gallons of water per hour with all nine heads in use. The shower configuration allows the system to be set up in a general purpose (GP) medium tent

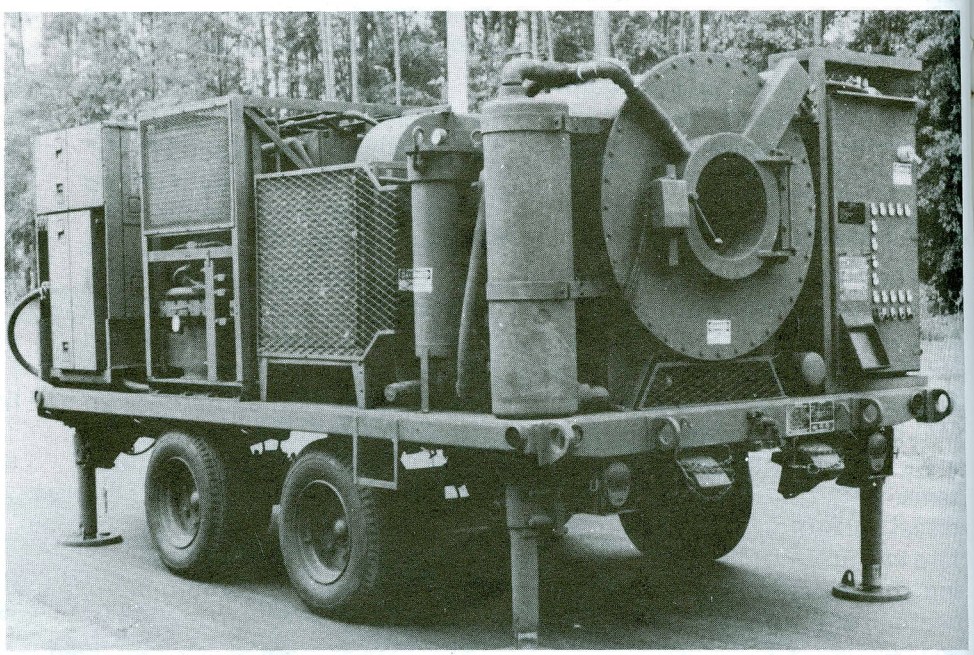


M85 Laundry Trailer

or the new Tent, Extendable, Modular, Personnel (TEMPER) in an L-shape or straight line. The shower comes with a wind screen to allow setup outside when no tentage is available or when quick setup, shower and tear-down mission is required. The shower sections can be split by placing three shower heads apart from the other six. This allows male and female showering at the same time in separate tents.



M85-100 Laundry Trailer



Laundry and Decontamination Drycleaning System (LADDS)

Doctrine

Some changes are underway for doctrine also. Revision of FM 10-280 (Mobile Field Laundry, Clothing Exchange, and Bath Operations) is scheduled to begin late in FY 91. This revision will include the newest policies, procedures and the latest equipment changes and additions.

The reorganization to the new Quartermaster Field Service Company (table of organization and equipment (TOE) 42-414L000) format officially starts in FY 93. However, a few companies have already started the conversion process. The new field service company will be a direct support company designed to absorb the laundry, shower, clothing exchange and renovation missions from the Field Service Company, General Support (TOE 29-114) and the Supply and Service Company, Direct Support (TOE 29-147). The new Quartermaster Field Service Company will remain a corps asset and will be equipped and staffed to support 18,500 divisional and nondivisional soldiers per week. The Quartermaster Center and School is looking at new initiatives in equipment and technology in field services to support Air Land Battle-Future. Equipment and doctrine are being analyzed to ensure that the required support in the rear as well as forward areas is available for all soldiers. Air Land Battle Future doctrine indicates that equipment and doctrine must be able to support forward units with an organic, limited field service capability while still maintaining the formal Quartermaster structure for more responsive, complete field service support.

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AIRDROP SUPPORT TO THE ARMY

James S. Emery

Airdrop, as Army systems go, is a relatively new method of delivering people, supplies and equipment into difficult-to-reach or enemy-held areas. Before World War II, the U.S. Army had no airborne/airdrop capability. However, in a few short years beginning in 1940, the Army identified a deficiency in its ability to deploy soldiers into combat and developed a concept for using airborne soldiers. The Army developed tactics and techniques and purchased new equipment. Procedures and training programs were created to train thousands of airborne soldiers. Several airborne divisions were successfully employed before the conclusion of the war in 1945. Compared to the rather lengthy development cycle we work under today, this was a truly remarkable achievement.

Background

Aircraft constraints limited airdrop in World War II to personnel and small "door bundles" loaded with supplies and small items of equipment. Larger pieces of equipment along with the crews were inserted by using gliders, frequently towed behind the airdrop aircraft.

The next major step in the evolution of airdrop came during the Korean Conflict. By the 1950s aircraft had evolved so that they could be loaded and unloaded through the tail section rather than the side doors. The Army capitalized on this new technology by developing airdrop systems to successfully drop large pieces of equipment that were extracted, in flight, from the rear of the aircraft. This allowed the airdrop of soldiers along with their supporting equipment for the first time and, consequently, made the glider obsolete.

During this same period, responsibility for airdrop resupply doctrine and parachute rigger training was transferred from the U.S. Army Infantry School, Fort Benning, GA, to the U.S. Army Quartermaster Center and School, Fort Lee, VA. Also, the airdrop support organizations that began to evolve during World War II were refined and formalized into Quartermaster airdrop units that remained virtually unchanged from the Korean Conflict until the late 1980s. This concept called for assigning an Airdrop Supply Company (TOE 10-407) and an Airdrop Equipment Repair and Supply Company (TOE 10-417) to **each** corps and Theater Army Area Command (TAACOM). In addition, the airborne divisions were authorized their own organic support in the Airdrop Equipment Support Company (TOE 10-337).

Heavier and Heavier

Each Airdrop Supply Company was designed to provide 200 short tons of airdrop resupply per day ranging from supply bundles weighing 250 pounds or less up to equipment platform loads which have become heavier and heavier over the years. Currently, these units can drop loads weighing in the range of 42,000 pounds. The heavy lift equipment and the large numbers of air items to meet such a varied requirement made these units expensive to

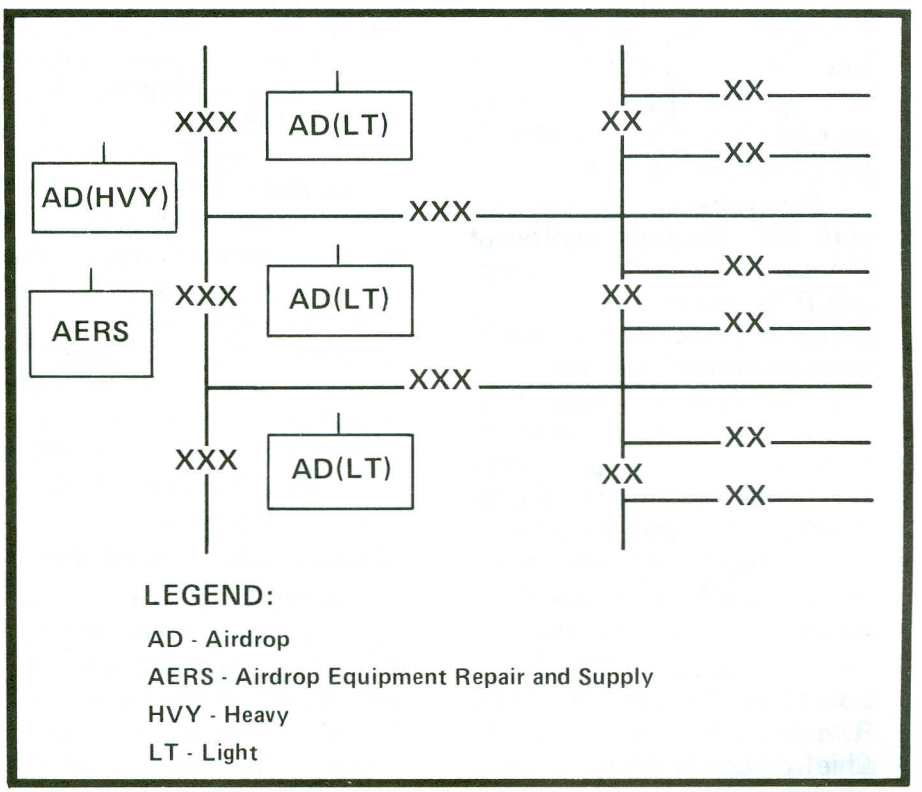


Figure 1. New Airdrop Concept

resource, both in personnel and equipment, and difficult to deploy rapidly.

The Airdrop Equipment Repair and Supply Company was designed to provide airdrop equipment supply and maintenance support to the Airdrop Supply Company. This unit was organized under the assumption that almost 100 percent of the air items used for an airdrop would be recovered and returned to the unit for later airdrops. This meant that the personnel designing the TOE included more parachute riggers in the organization than supply personnel. The airdrop planning factors would later show this return of airdropped items to be a false assumption.

Under the old concept, it took approximately 500 military spaces to provide airdrop resupply support to a corps force with another 500 identical spaces located in the supporting TAACOM. With the personnel and dollar constraints over the years, the result was that very little airdrop force structure has been resourced in the Active Component.

From the Korean Conflict until 1986, the only significant change to the airdrop support unit TOEs was to update them to reflect the new items of equipment developed over the years. Little attention was given to the overall support concept or to the structure of the support units. There was simply no basis for making a change because we did not know what the airdrop resupply workload would be under any given circumstance.

In 1983, during the initial Logistics System Program Review (LSPR) held for the Vice Chief of Staff, Army, the lack of airdrop planning factors was identified as a significant logistic deficiency. The Quartermaster Center and School, working with the entire airborne community, developed a set of airdrop planning factors approved by the Department of the Army's Office of the Deputy Chief of Staff for Logistics (DA ODCSLOG) and published in FM 101-10-1/2 (Staff Officers' Field Manual Organizational, Technical, and Logistical Data Planning Factors (Volume 2)) in October 1987. These planning factors enabled staff planners to compute, for the first time, a realistic airdrop resupply workload based on a specific geographic region.

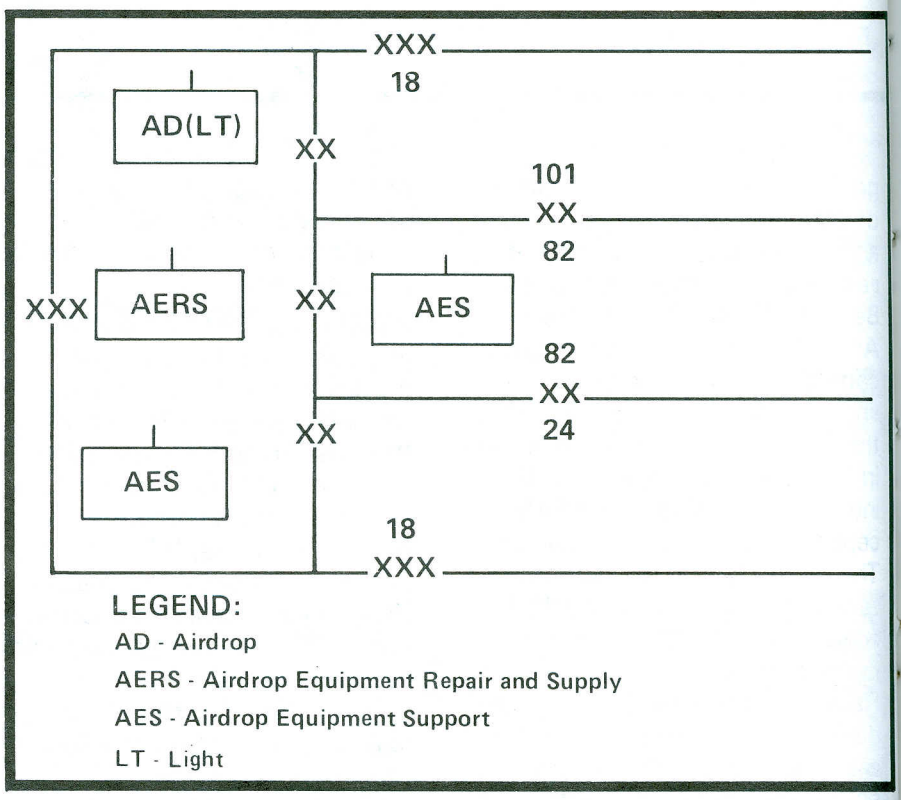


Figure 2. New Airborne Corps Airdrop Support Concept

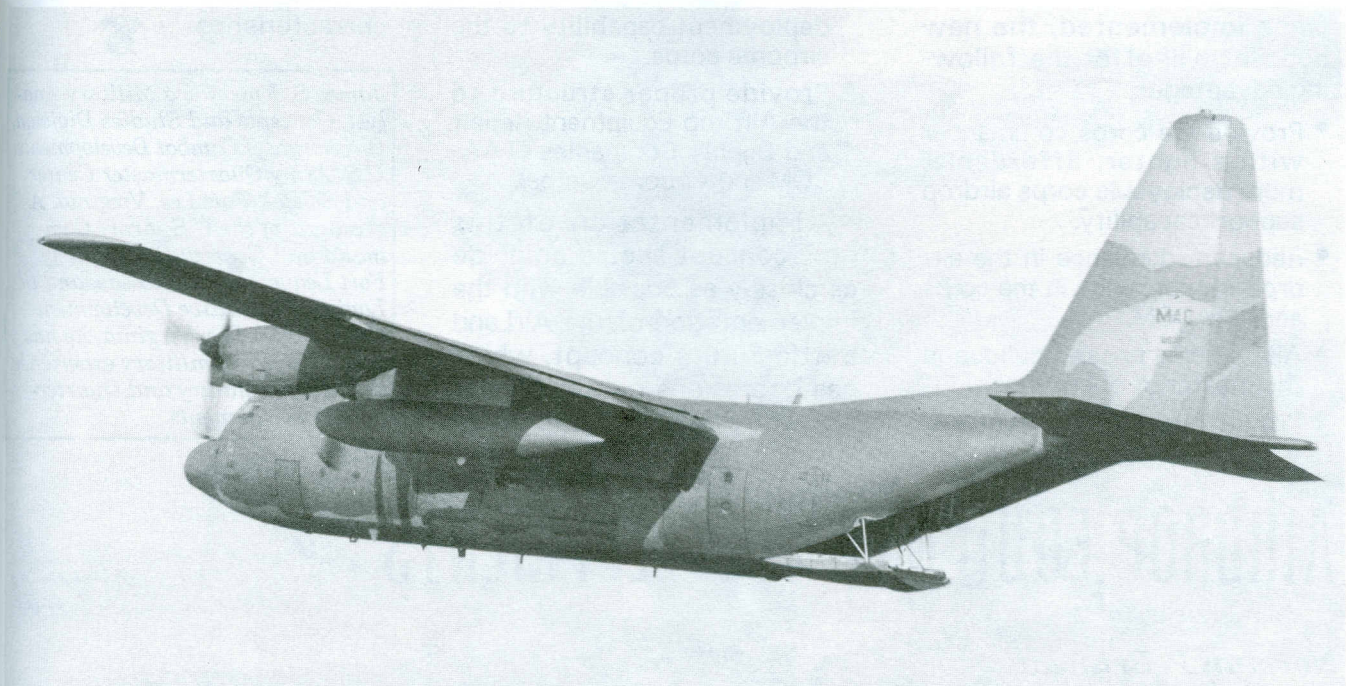
Airdrop To Support The Force

In 1986, using the newly approved airdrop planning factors as a guide, the Quartermaster Center and School began to develop a new airdrop support concept. The new airdrop concept (Figure 1) is based on the airdrop planning factors and designed to make the corps airdrop resupply support organizations highly deployable and more affordable in terms of people and equipment. The new airdrop concept provides the corps commander with doctrinal airdrop resupply support at a cost of less than half of the personnel required under the old concept.

Under the new concept, each corps, including the airborne corps, will be authorized a Light Airdrop Supply Company (TOE 10-443L) designed to airdrop various types of supply bundles weighing up to 2,200 pounds each. The development of a light company is based on the airdrop planning factors which show that approximately 90 percent of the airdrop resupply requirements can be met in this manner.

TAACOM Support

Each TAACOM will be autho-



The C-130 can drop 16 A-22 containers (2,200 pounds each) on a single pass across a drop zone. The C-130 and the C-141 are the current airdrop aircraft. The C-141 can drop 40 A-22 containers.

rized a Heavy Airdrop Supply Company (TOE 10-643L) and an Airdrop Equipment Repair and Supply Company (TAACOM, TOE 10-673L). The Heavy Airdrop Supply Company will provide reinforcing support to the Light Airdrop Supply Companies in the corps. In addition, it will be responsible for the airdrop of the heavier items that cannot be rigged by the light companies, such as bridging and heavy barrier materials. The Airdrop Equipment Repair and Supply Company (TAACOM) will provide airdrop equipment supply and maintenance support to the Heavy Airdrop Supply Company in the TAACOM and to the Light Airdrop Supply Companies in the supported corps (other than the airborne corps). This company will be structured primarily with supply personnel rather than parachute riggers since the airdrop planning factors show that very small quantities of airdrop equipment will be successfully recovered and returned. Airdrop support to the airborne corps is unique and requires a separate discussion.

Airborne Corps Unique

In the old concept the airborne corps was authorized two Airdrop Equipment Repair and Supply Companies, one to support the Airdrop Equipment Support (AES) Company organic to the airborne division and one to support the Airdrop Supply Company at corps. The AES Company's mission is to provide parachute packing, maintenance and rigging support to get the division ready for an airborne mission anywhere in the world. Note that the old concept did not authorize an AES Company to perform a similar mission for the large number of corps airborne elements which will also arrive by parachute. This mission fell, by default, on the Airdrop Supply Company which is not properly structured for such a mission.

Under the new airborne corps concept (Figure 2), the airdrop support to the airborne division remains unchanged. However, significant changes are in the corps structure. An Airdrop Equipment Support Company (Airborne Corps) (TOE 10-453L) is scheduled for development in FY 92. For the first time, the airborne elements of the airborne corps will have an organic unit properly designed to support them in their deployment mission. The airborne corps will also have a Light Airdrop Supply Company, the same as the other corps. Since there will be three airdrop support units in the airborne corps, it will also be authorized an Airdrop Equipment Repair and Supply Company (Airborne Corps) (TOE 10-463L). This company will provide airdrop equipment supply and maintenance support to the three airdrop support units shown. The new airdrop concept will continue to evolve over the next several years.

Once implemented, the new concept will offer the following advantages:

- Provide the corps commander with a lighter, affordable, more deployable corps airdrop support capability.
- Reduce redundance in the airdrop support units in the corps and TAACOM.
- Allow for a phased buildup in the theater of operations.
- Provide a properly structured deployment capability to the airborne corps.
- Provide proper structure to the Airdrop Equipment Repair and Supply Companies (TAACOM and Airborne Corps).

Implementation of this new concept should coincide as closely as possible with the implementation of the AirLand Battle-Future concept, which has operations on a nonlinear battlefield as one of its primary characteristics.

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AIRDROP EQUIPMENT DEVELOPMENTS

Norman P. Bruneau

Airdrop is a proven way to provide logistical support when fighting, outnumbered, against an enemy with significantly shorter supply lines. This realization drives development of new airdrop equipment. This realization also prompted deployment of airdrop equipment to Saudi Arabia in 1990 for just such an eventuality. The Directorate of Combat Developments at the U.S. Army Quartermaster Center and School, Fort Lee, VA, continues to focus on the following wartime requirements for airdrop:

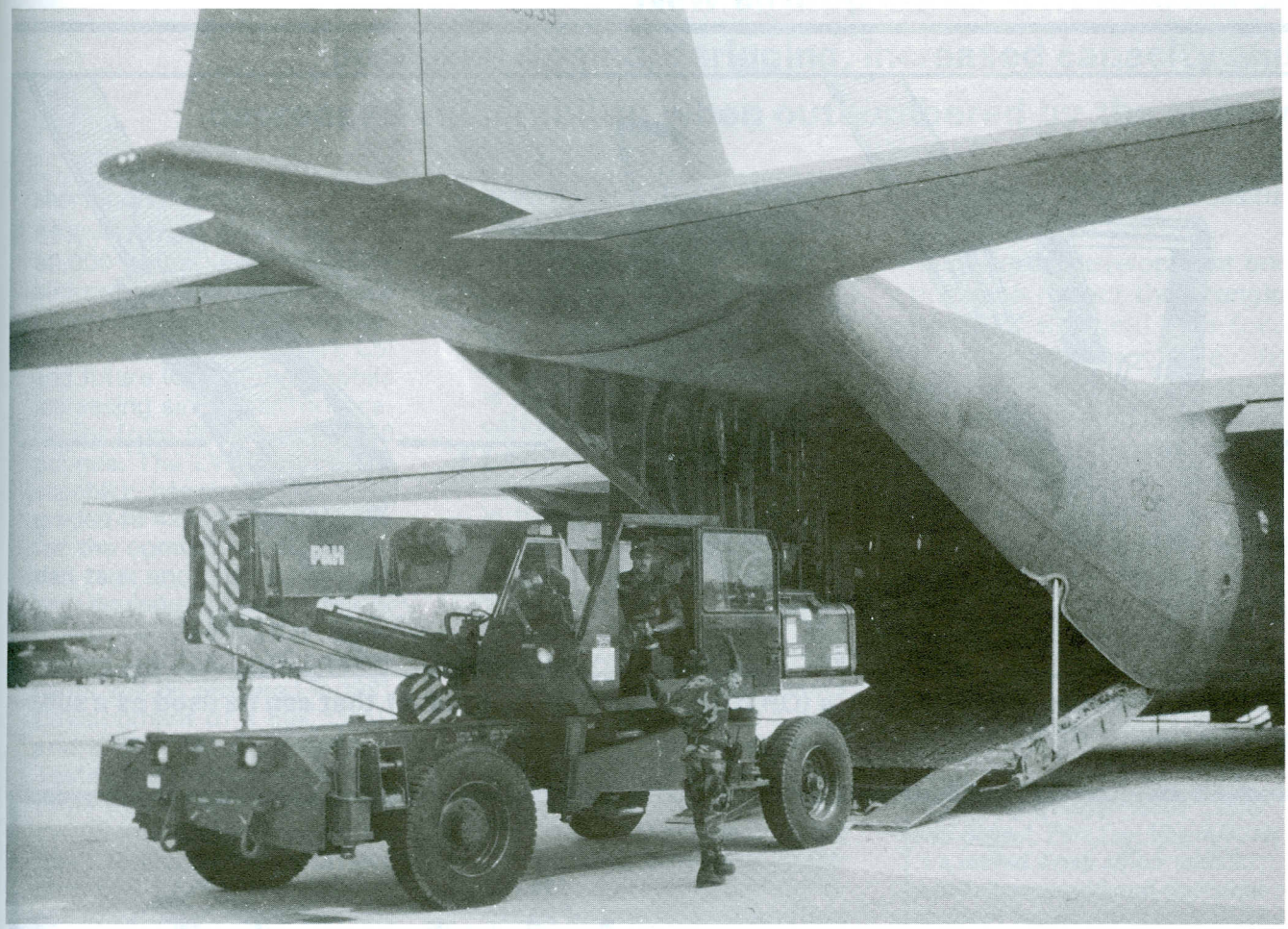
- Improved rigging and derigging programs
- Increased airdrop capacity
- Decreased airdrop vulnerability

Navy Cranes

In 1988 the Army was still looking for an air transportable lifting device (ATLD), a crane easily transported by air by a C130 and easily deployed to remote or intermediate staging bases (ISB). The ATLD would be used at ISBs for rigging loads weighing up to 42,000 pounds, which previously could only be rigged at home station with installed overhead cranes. Rigging all heavy airdrop loads before deployment greatly reduced the warfighting commanders' flexibility at the staging base and resulted in inefficient use of deployment aircraft. In 1988, the Quartermaster Center and School identified and arranged for testing a 14-ton capacity, C130 transportable crane that the Navy had purchased for container handling. These 14-ton cranes were successfully deployed by air and evaluated by the 82d Airborne Division, Fort Bragg, NC, during ISB operations in Exercise Market Square II in 1988. Two of these cranes, in unison, lifted loads weighing up to 42,000 pounds for rigging. In 1989 the Army classified and directed procurement of the 14-ton cranes for rigger units. Active duty rigger units received the cranes in 1989, and reserve units began to receive the cranes in 1990. Several 14-ton cranes were deployed for possible ISB rigging operations in Operation Desert Storm. The timely identification, testing and fielding of the 14-ton cranes took less than two years and reflected favorably upon the responsiveness of the materiel acquisition system.

New Airborne Items

In 1990, the U.S. Army Natick Research, Development and Engineering Center at Natick, MA, and the Quartermaster Center and School agreed to include two additional items in the airborne rigging inventory that will greatly improve rigging and derigging operations. The commercially available Quick Release Tiedown Device (QRTD) improves rigging and derigging times (decreasing derigging time by 43 percent). The QRTD is less expensive than the current loadbinder. The Army expects to begin procuring the QRTD by late 1991. An improved drive-off aid was also approved in 1990 for derigging operations. It will replace the old universal drive-off aid which did not fit the new family o



The 14-ton Navy cranes proved to be the solution for remote heavy drop rigging operations.

High Mobility Multipurpose Wheeled Vehicles (HMMWVs), 2 1/2-ton and 5-ton vehicles. The improved drive-off aids should be available for requisition in 1991.

AMEMS

The Natick Research, Development and Engineering Center has also developed a software system called the Airdrop Missions and Equipment Management System (AMEMS) to increase the productivity of airdrop rigging companies by enabling them to plan airdrop missions and control air item inventory more efficiently. Large-scale mission planning and inventory control time requirements have been reduced from several days to less than an hour. AMEMS is currently in use at Fort Bragg, NC.

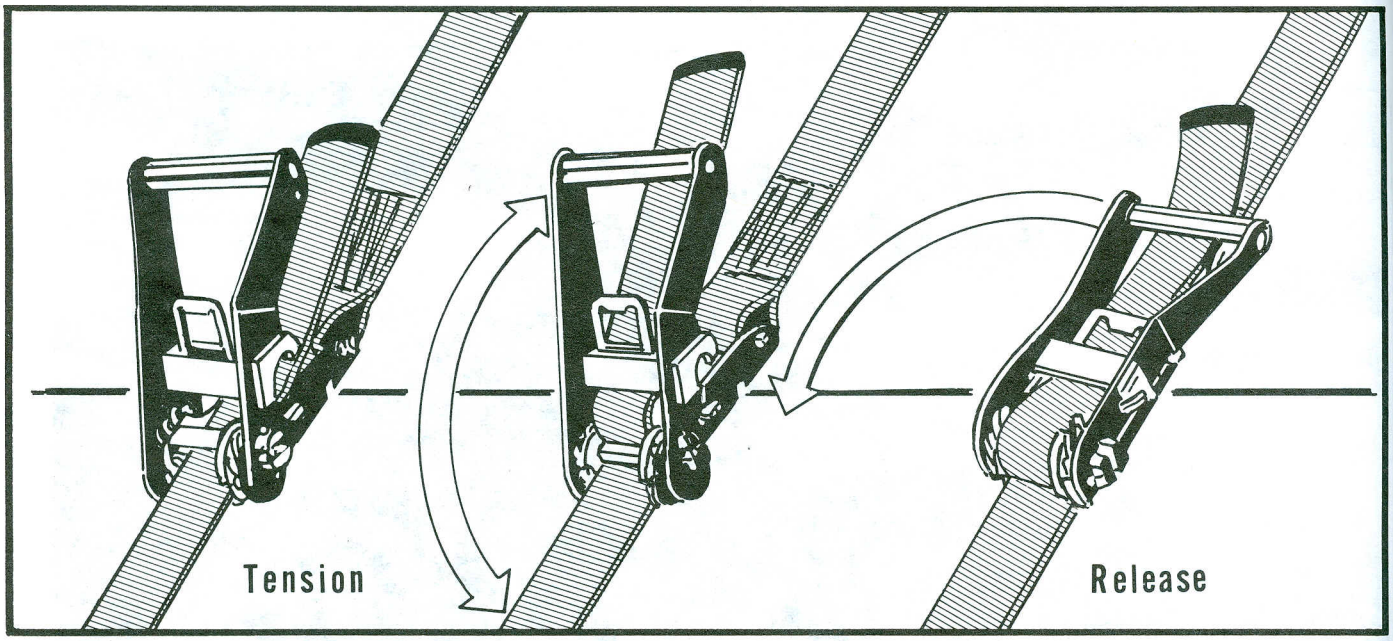
Parachute Analysis

The Natick Research, Development and Engineering Center and the Quartermaster Center and School have begun analyzing benefits of prepacked, vacuum-sealed cargo parachutes. Indications are that this process will dramatically increase shelf life, allow for storage under nonclimatic conditions, reduce volume by 40 percent, and provide limited nuclear, biological, chemical (NBC) protection. The greatest benefit will be increased readiness. With this capability, parachute war reserves can be stored in a prepacked configuration, ready for use, upon issue. No depot or unit pack requirements for wartime usage would exist.

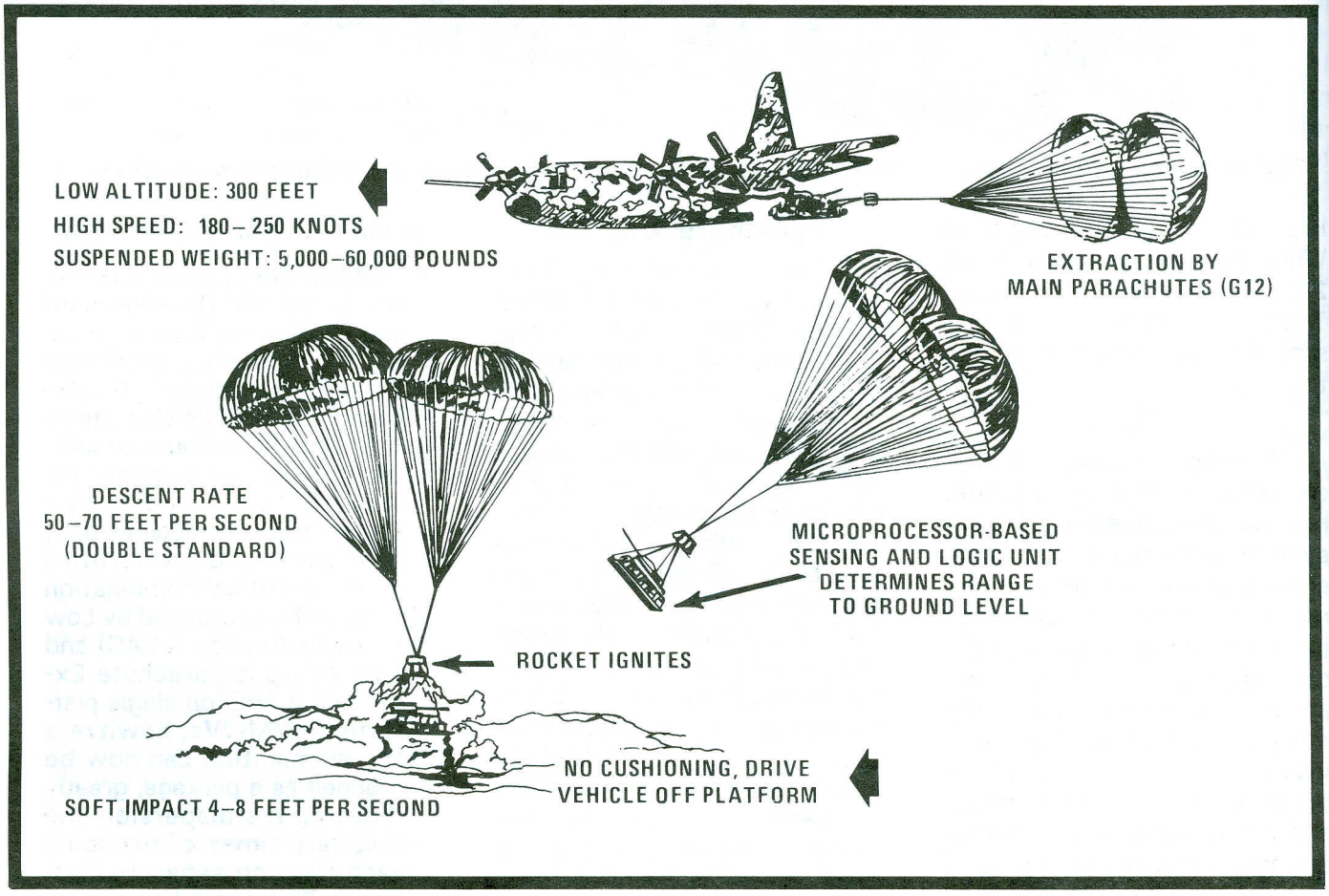
Airdrop Capacity

The following efforts focus on increasing airdrop capacity:

- **Combination Loads**: The Natick Research, Development and Engineering Center, working with the Quartermaster Center and School and the Airborne and Special Operations Test Board, continues to capitalize on the capabilities of the standard Type V airdrop platform. Rigging procedures have been developed and certified to allow critical combination loads to be airdropped by Low Velocity Airdrop (LVAD) and Low Altitude Parachute Extraction (LAPE) on single platforms. HMMWVs, howitzers and ammunition can now be dropped as a package, greatly reducing the dispersion and recovery times of dropping each item on separate platforms. This capability also increases the Army's capacity to deliver more items to



The Quick Release Tiedown Device (QRTD) is a commercial product that can be used as a substitute rigging item.



The Low Altitude Retro-Rocket System (LARRS) will provide a 300-foot altitude platform delivery capability.

New airdrop equipment focuses on improved rigging/derigging, increased capacity and decreased vulnerability when outnumbered by the enemy.

shorter drop zones.

- **60K Airdrop System**: The 60,000-pound (60K) capacity airdrop system is a multiphase program designed to capitalize on current (C130, C141, C5) and future (C17) aircraft, while increasing single platform capacity from 35,000 to 60,000 pounds. The LVAD and LAPE capability has already been upgraded to 42,000 (42K) pounds for the combat-loaded Sheridan tank and numerous engineer equipment loads. The 42K LVAD capability has been fielded and 42K LAPE components will be procured in 1991. Development of a 60K LVAD and a 60K LAPE continues. Testing and fielding these systems depends on upgrading the C5 and on fielding the future C17 aircraft that will have both 60K LAPE and LVAD capabilities. Type classifications of both 60K airdrop capabilities are projected for 1994.

Decreased Vulnerability

The Army and the Air Force have jointly agreed that lower altitudes and faster drop speeds are the key to reducing the exposure time to the enemy of delivery aircraft on the battlefield. The following programs aim to reduce aircraft vulnerability and, therefore, airdrop load vulnerability on the battlefield.

- **ECDS**: The Enhanced Container Delivery System (ECDS) was developed to improve the current 600-foot, 150-knot Container Delivery System (CDS). The CDS consists of multiple (up to 40 per aircraft), airdroppable, 2,200-pound supply containers. Phase I of the ECDS program brought CDS dramatically down to 300 feet at 150 knots through a simple parachute modification (G12E). This system is in use now. Phase II ECDS development will produce a 300-foot system to work at both 150 and 250 knots. Phase II ECDS will capitalize on both current 150-knot and future 250-knot delivery aircraft. Phasell ECDS is projected for type classification in 1994.
- **LARRS**: The Low Altitude Retro-Rocket System (LARRS) is being developed to accurately deliver platform loads weighing up to 60,000 pounds from 300-foot drop altitudes at drop speeds up to 250 knots. LARRS will combine parachutes and retro-rockets to decelerate loads to a soft landing (8 feet per second) without using standard "honeycomb" cushioning material. This will allow a drive on/drive off platform capability, greatly reducing rigging and derigging materials handling equipment (MHE) requirements and response time. LARRS is expected to be type classified in 1996.

Airdrop development continues to reflect the changing needs of the field. The focus remains on improving airdrop rigging/derigging operations, increasing airdrop capacity and decreasing airdrop vulnerability. Airdrop may be the only way to provide logistical support when fighting, outnumbered, against an enemy with shorter supply lines.

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The smaller G12 cargo parachute has been vacuum packed.

AVIATION SUPPORT BATTALION

CPT Raymond W. Lemaster

THE NEED

Army Aviation assets play a critical role in AirLand Battle doctrine. The aviation brigade is the division commander's most maneuverable asset. It can find, fix and destroy enemy forces using maneuver to concentrate and sustain combat power at the critical time and place. The brigade also provides timely reconnaissance and intelligence throughout the division area. It will normally operate in maneuver brigade areas, across the forward line of troops (FLOT), on deep operations in support of division objectives, or in the division rear destroying threat units engaged in rear operations. To maximize the potential of the AH64 and OH58-D helicopters, the army needs agile logistics support to arm, fuel and fix the brigade's weapons systems. For that necessary agility and responsiveness, the Army built a logistics command and control organization directly supporting the aviation brigade. This organization called the aviation support battalion (ASB) has the mission to "provide logistics support to include direct support (DS) supply of Class I, II, III, IV, VII and IX, conventional DS maintenance, and aviation intermediate maintenance to the division aviation brigade, heavy division." The ASB was designed to provide the aviation brigade the same "focused support" as maneuver brigades.

THE DESIGN

The ASB (Figure 1) was designed by the U.S. Army Quartermaster Center and School, the U.S. Army Ordnance Center and School, the U.S. Army Aviation Center, and the U.S. Army Aviation Logistics Center under the direction of the U.S. Army Combined Arms Support Command and Fort Lee (Provisional) (USACASCOM&FL (PROV)). The ASB was designed primarily as a tailored forward support battalion (FSB). This support unit will be able to provide the aviation brigade with the dedicated support, sustainment, planning and execution capability to succeed on the modern battlefield. It will also enable the aviation brigade to easily deploy separately from the division for contingency operations. The importance of deployment capability was demonstrated during Operation Just Cause in Panama.

The ASB as currently designed consists of three companies: the headquarters and supply company (HSC), the ground maintenance company (GMC) and the aviation maintenance company (AMC). The HSC supports the aviation brigade and the ASB units by providing Class I (rations), II (general supplies), III (petroleum, oils and lubricants), IV (construction and barrier materiel) and VII (major end items) supplies. It provides consolidated field feeding for ASB personnel. The HSC operates a JP4 refuel point for the command aviation company and assault aviation companies. It also operates a Class III (aviation) transload site to resupply forward area refuel points (FARPs) operated by the attack helicopter battalions and the cavalry squadron.

The GMC provides ground maintenance and repair parts support for both air and ground equipment to the assigned, attached and division support command (DISCOM) units supporting the aviation brigade.

The AMC provides aviation intermediate maintenance for all aircraft assigned or attached to the division and conducts backup aircraft recovery and evacuation for all divisional aircraft.

ON THE GROUND

In 1988, an ASB was created to support the 9th Infantry Division (Motorized). Based upon the success of this organization, the ASB concept was approved. Two ASBs were created in United States Army, Europe (USAREUR) in 1990, one in 3d Armored Division (AD) and one in 1st AD. The 3d AD unit, 9-227 Aviation Support Battalion, was identified as the unit to validate the ASB concept. A USACASCOM&FL (PROV) evaluation team made a preliminary visit in November 1990. Evaluators sought subjective, command-level input on the tentative table of organization and equipment (TTOE) (63826T200) and the ASB concept. The 9-227 ASB was built primarily with aviation brigade and DISCOM assets already within the division.

The HSC is the Quartermaster unit within the ASB. Its mission is similar to A Company's within the FSB. It is designed to receive, temporarily store and issue one day of supply.

Class I	6.4
Class II	3.3
Class III (packaged)	0.5
Class IV	3.6
Class VII	4.8

Usually, supply point distribution using truck to truck transfer will achieve this mission. The HSC also receive, temporarily store and issue one day of supply of bulk Class III.

Storage Capability - 78,600 Gallons

Distribution Capability - 71,200 Gallons

For bulk Class III operations, the HSC has four 5,000-gallon tankers, six fuel Heavy Expanded Mobility Tactical Trucks (HEMTT), and a fuel system supply point (FSSP). For its retail Class III mission, it has four forward area refueling equipment (FARE) systems with 18 500-gallon collapsible drums and four HEMTT Tanker Aviation Refuel Systems (HTARS).

The HSC has two unique supply missions: to provide a transload capability to the aviation brigade's FARPs and to augment ammunition transfer points. The FARP provides both the aviation battalions and cavalry squadron the ability to maximize aircraft time on target. FARPs are designed to displace rapidly and to operate under a jump concept.

THE FUTURE

LTC Donald P. Townsend, the battalion commander of the 9-227 ASB, believes that the ASB is a viable organizational concept. He believes the ASB has proven that it will work and that it will give the aviation brigade "the focused support that they need." He says the ASB's ability to think ahead and anticipate the logistical requirements of the aviation brigade gives the aviation brigade "a great deal of flexibility. " Recent deployments of separate aviation brigades highlight the need for this organic support. Though not identical to an FSB, the ASB greatly increases this flexibility of support provided to the aviation brigade. This organization meets logistical imperatives of integration, continuity, anticipation, improvisation and responsiveness.

Though not yet validated, the ASB appears able to accomplish its mission within the heavy division. The improved support to the aviation brigade allows it to better focus its energies on executing the battle plan. Despite being a new unit, the ASB has earned the respect of the command structure within the division.

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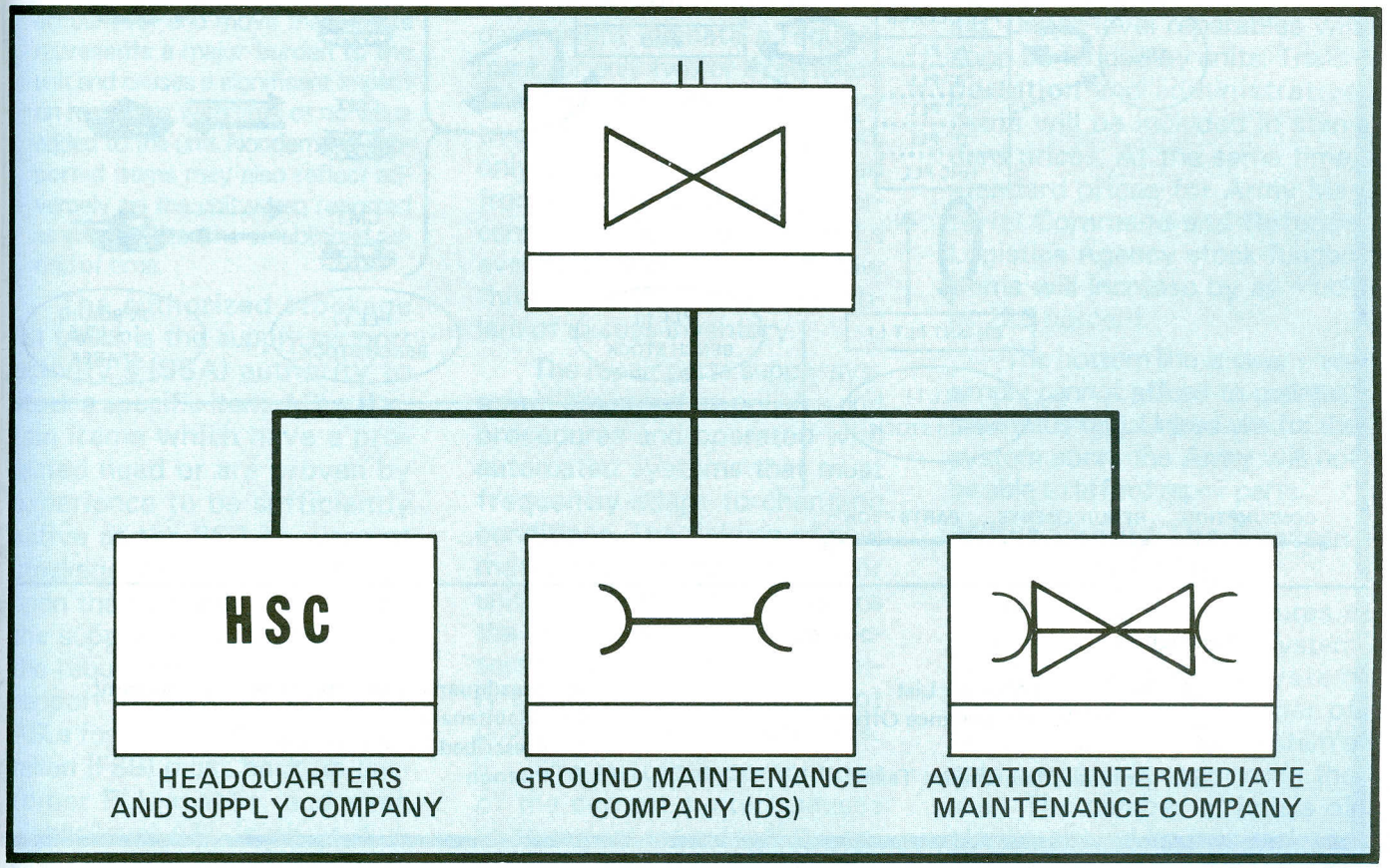


Figure 1. Proposed Structure of the Aviation Support Battalion

BATTLEFIELD SPARES SYSTEM

John Finger

Background

The Army's repair parts supply system has been criticized for some time. Reports from the Army Audit Agency, the General Accounting Office, and various contract research activities describe current supply procedures as inefficient and ineffective, resulting in excess repair parts. Recent field exercise data (1988-1989) examined by the Army Materiel Systems Analysis Agency confirm the low rate of filling orders at division level and below. In March 1990, the Department of the Army tasked the Training and Doctrine Command and the Army Materiel Command to modify the system.

Where We Are Today

Today's repair parts supply system (Figure 1. Current Unit-Level System) has changed considerably and has outlived several automated systems. However, the basic concept has not changed since the system began in the late 1950s. The current system is characterized by numerous layers of repair parts supply, each layer backing up the next lower echelon.

The prescribed load list (PLL) is a unit's authorization to stock repair parts. In supply jargon, "PLL" can either mean the prescribed load list itself or the stocks authorized by the list. Approximately 9,000 Army units are authorized to maintain a PLL. A unit that maintains a PLL may stock up to 300 lines of repair parts.

Three PLL Stocks

The unit maintains PLL stocks in one of three different ways: separate PLL by company, collocated PLL at battalion level, or consolidated PLL stockage

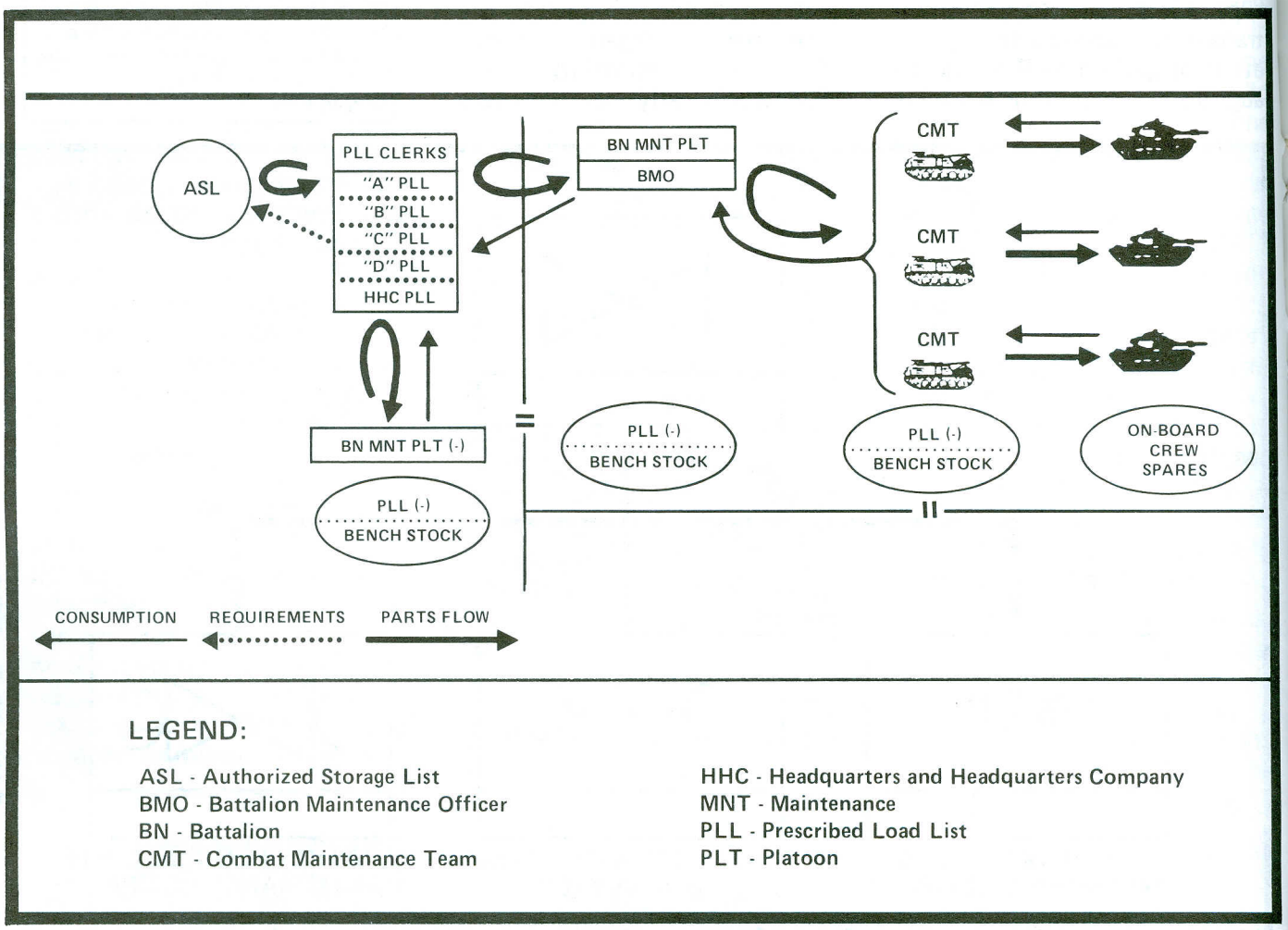


Figure 1. Current Unit-Level System

at battalion level. The option is usually dictated by the type of unit and where the unit performs maintenance. For example, the collocated option usually applies to heavy maneuver units. The PLL consists of two broad categories of repair parts: demand supported and nondemand-supported.

- Demand-supported items are repair parts requiring a specific number of demands within a specified time period to be eligible for stockage at the unit.
- Nondemand-supported items are repair parts carried on a unit's PLL without meeting the criteria for stockage. These categories of repair parts are **required.** The commander can also designate parts essential to the PLL. Essential parts include categories such as Mandatory Parts List (MPL) items, initial stockage and Support List Allowance Card items. Once stocked, these items are usually retained for a specified time, regardless of demand. The requirement to possess, account for and move these parts represents a major burden to the unit and causes a significant impact on resources with little or no value added to the unit. Nondemand-supported items may also reflect adversely on the unit when reported as excess after the established period of time.

The authorized stockage list (ASL) is the supply support activity's (SSA) authority to stock a specific item. ASLs contain items which have a projected need or are proven by experience to be sufficiently active at the SSA to warrant stockage. An SSA's ASL builds upon the demands received by the supported units' PLLs and the requirements of the direct support maintenance activities. ASLs for a forward support battalion (FSB) must back up customer PLL stocks, and each higher-level ASL (such as division main and corps) must back up the ASL below it.

What's Broken?

Unfortunately, the system has some problems, and their effects are becoming more evident all the time.

The cost of the inventory allowed by the system is too high. A tremendous variety of repair parts is required to repair and maintain the wide spectrum of Army vehicles and weapon systems. The cost of stocking sophisticated, expensive parts in PLLs is compounded by multiple layering of repair parts. Under the current rules, if demands are sufficient to have an item on a company PLL, the minimum stockage quantity is two. Experience shows that PLLs are comparable for similar companies in a battalion. This means that a battalion with five companies should have a total quantity of 10 of a given item (minimum stockage quantity of two times five companies) when the probability of failure in 15 days might indicate a requirement for only two or three items. The system is simply not effective. Of all the parts required, only 15 to 20 percent are filled from unit PLLs. Less than 32 percent of the MPL items on PLLs ever receive demands. This low "hit rate" compounds the problem of excess inventory.

The repair parts supply system is governed by policies and procedures and operated with automated systems that must frequently adapt to changing conditions. The fielding of new materiel systems with their unique repair parts further strains the supply system. These factors have resulted in constantly changing stock that is not providing the expected results.

The extreme complexity of the current system causes us to expect more from the operator of the system, the PLL clerk, than he is able to provide, given his educational level, training, experience and technical supervision. The PLL clerk receives 10 weeks of training and then is expected to operate this complex system without supply supervision. To make the problem worse, Army of Excellence reductions left fewer authorizations for PLL clerks than required to do the job. Maneuver commanders and logisticians alike work this system to make it responsive. In spite of their efforts, they have not been able to overcome the weaknesses built into the system.

In the very near future, the repair parts supply system will face even more problems. Defense Management Review mandatory fund reductions of about $3 billion over the next five years will limit the money available for repair parts. Also, more automated changes are on the way. Revised Army Stock Fund procedures are also coming. Depot-level reparables will soon be funded by units. Transportation and administrative costs will be included in standard prices. At the same time, standard prices for Army Materiel Command and Defense Logistics Agency stock-funded items will increase by as much as 22.5 percent.

The bottom line is clear - we simply cannot afford to maintain the status quo. Unless we fix the system soon, the Army will not be able to afford repair parts.

What Should The System Look Like?

We know what features a good repair parts supply system should have. A good system should not burden the user of the parts. After all, the system's sole purpose is supporting the user. The number of levels of stocks should be minimal and should concurrently provide for much higher "hit" rates on

TOTAL PARTS ..... [redacted]
CAPABILITY TO REPAIR..... [redacted]
PROBABILITY OF FAILURE (ENGINEERING + FEDC).. [redacted]
TIME TO REPLACE (WITH OC&S SME REVIEW)..... [redacted]
COMBAT CRITICALITY (WITH PROPONENT SME REVIEW)..... [redacted]
DESIRABILITY TO STOCK..... [redacted]

- TRANSPORTABILITY
- MODULE VERSUS PIECE PART
- DENSITY OF EQUIPMENT (DEPTH)
- COMMON CHASSIS PART (DEPTH)
- COST

FURTHER ARRAYED BY:

- PEACETIME TRAINING VERSUS WARTIME CAPABILITY
- DEPLOYABILITY REQUIREMENTS
- UNIT TRAINING/OPERATION PROFILE AND TEMPO

LEGEND:

FEDC- Field Exercise Data Collection
OC&S - Ordnance Center & School
SME - Subject Matter Expert

Figure 2. Decision-Based Stockage

needed stocks. Error rates should be low because senior supply specialists operate and manage the system with the training, technical supervision and mentoring to do what is expected. The system should operate with low order ship times (OSTs) resulting from better communications and automation as well as from dedicated, rapid transport. Finally, a good repair parts supply system should provide accurate, timely supply and transportation status.

Such a system would create an efficient, responsive and cost-effective means of providing repair parts. It would be compatible with AirLand Battle-Future concepts, particularly the maintenance concept. All of this could happen, by the way, within current force structure constraints. To create a good repair parts supply system requires a new management process, as well as a new method for making stockage decisions.

Decision-Based Stockage

The high-quality ASL that a new system requires can be created with a technique developed by the Army Materiel Systems Analysis Activity called Sparing to Availability (STA). STA subjects all possible parts of a given system to a series of increasingly discriminating filters (Figure 2. Decision-Based Stockage). The parts that make it through all the filters are candidates for the ASL. STA then uses the list of candidates and corresponding worldwide consumption data to build an ASL that meets the specified readiness requirement at the lowest total cost, including considerations such as weight and cube requirements. Comparisons in-

dicate that an STA-derived ASL for a division has only about 50-60 percent of the weight, cube requirements and cost of an ASL derived by the current system. Also, operational readiness is comparable.

Management System

The Quartermaster Center and School is developing the necessary management process. Called the Battlefield Spares System (BSS) (Figure 3), it will be the objective repair parts supply system for AirLand Battle-Future.

Here is how BSS works. The forward support battalion owns the ASL, which is comprised of repair parts selected by the STA technique. All parts on the ASL are chosen for the ability to return weapon systems to fully mission capable status. Cosmetic items, scheduled services-related parts and all other noncritical parts come from stockage at corps level or above. The ASL is distributive: maintained in several locations to ensure responsiveness. Unit PLLs no longer exist. Instead, slices of the ASL tailored to a supported battalion's needs are located forward as sublocations of the ASL. The stock selected for these forward ASL locations is based on the equipment, mission and operational tempo of the supported units. If a part does not help a weapon system to move, shoot or communicate, it is not included.

A few parts that can be applied by crew members are carried on weapon systems as on-board spares. These parts are limited by available stowage space on the combat vehicle as well as by the maintenance and services the crew is authorized to perform. Weapon systems do not carry identical repair parts. This enables a platoon to have a wider variety of on-board spares. Consumption of on-board spares and requirements for parts beyond on-board spares to perform operator-level repairs are passed informally by the quickest means to the supporting company maintenance team (CMT). Each CMT carries a "slice" of the forward support battalion's ASL on its armored maintenance vehicle, which has the storage capacity for the parts and the automation to provide visibility and control of the parts.

Parts are provided directly to CMTs from the supporting forward ASL location by dedicated, rapid transport. Both scheduled and as-required deliveries are made. Transportation and drivers are under the operational control of the forward ASL operation. Scheduled delivery routes are operated in a hub and spoke pattern. As-required deliveries are handled the fastest way possible. Use of available air assets is considered.

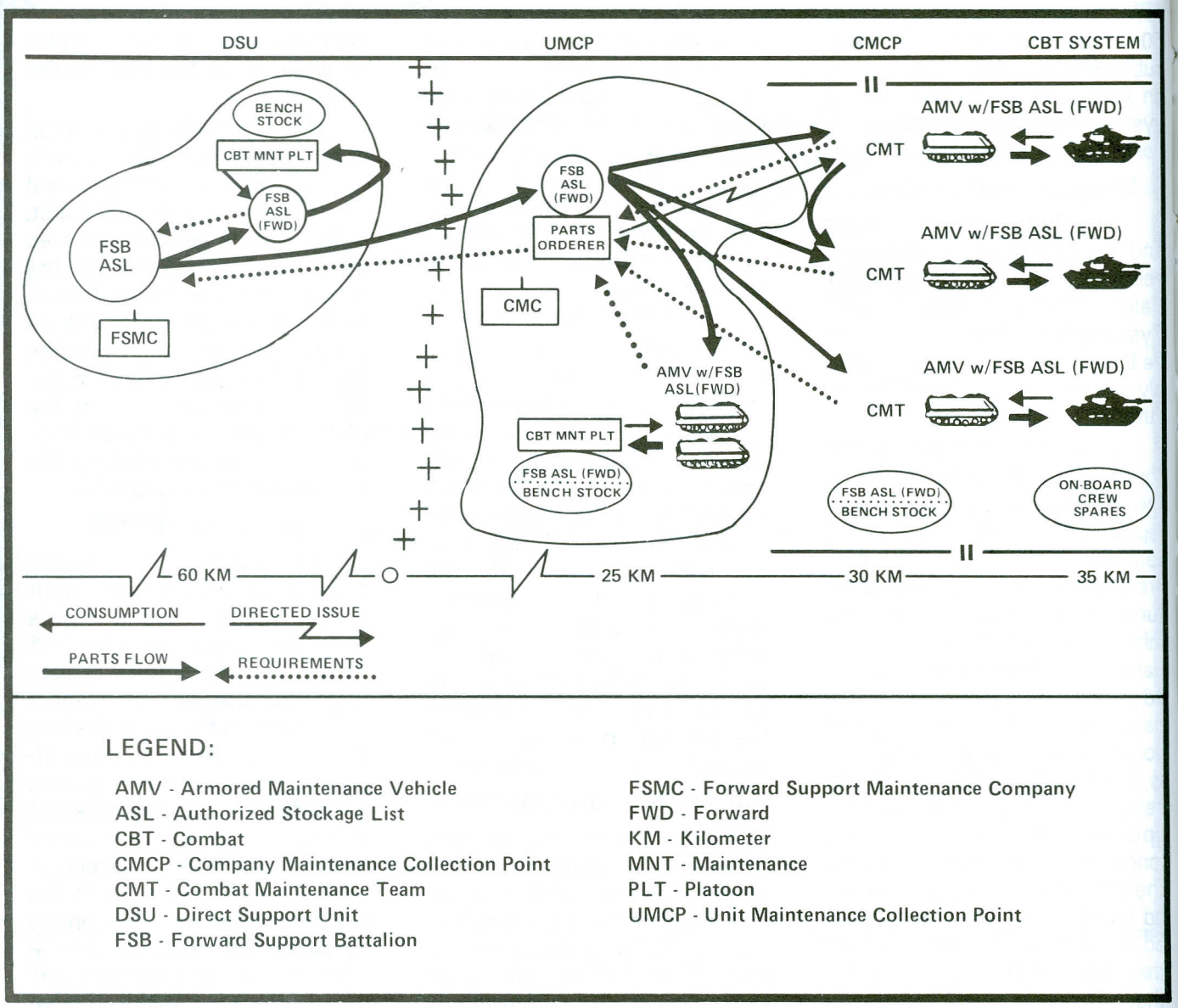
Senior 76-Series Soldiers

Senior 76-series military occupational specialty (MOS) soldiers at each ASL location will enter user requirements into the appropriate automated systems. These soldiers will be assigned to the FSB and positioned forward in the unit areas where they can expedite unit requirements. They will be trained in all aspects of repair parts supply support. Their general duty areas include requisitioning, storage, issue, parts identification, customer assistance, providing status, maintaining records and helping decide what parts will be stored in the forward locations of the ASL. They will be equipped with communications and automated data processing equipment (ADPE) that provide them enough visibility and control of parts to satisfy customer needs directly or to efficiently cross-level from one forward ASL location to another. Transportation will then pick up and deliver the item to the requester.

If a company or battalion is cross-attached, the stocks in the supporting ASL location and its personnel go with the unit. This will be a service provided by the supply system for the maneuver commander. A division support area ASL will be established to support division base units. Unlike the "main" ASL in the current system, the division support area ASL does not duplicate and back up the stocks in the forward ASLs.

Benefits of BSS

The BSS offers many advantages over the current repair parts supply system. It puts high-payoff repair parts forward. This will significantly reduce total stocks and provide higher "hit" rates on the items that are stocked, resulting in a more efficient, less expensive system. Simplified procedures, less layering and increased user confidence in the BSS will discourage excess repair parts. Parts are delivered directly to customers by dedicated, rapid transportation. Maneuver elements will benefit from the ability to meet operational readiness standards without having to carry piles of parts around the battlefield, and that means maneuver elements will be more agile. Maximum use of the capabilities of modern automation and communication coupled with the stockage philosophy of BSS provide a single supply system for all the repair parts used in a division. Accountability is maintained as far forward as required to ensure visibility and control of parts. BSS will be service oriented - the supply system does the work, not the customer. Finally, BSS will ensure



LEGEND:

AMV - Armored Maintenance Vehicle
ASL - Authorized Stockage List
CBT - Combat
CMCP - Company Maintenance Collection Point
CMT - Combat Maintenance Team
DSU - Direct Support Unit
FSB - Forward Support Battalion
FSMC - Forward Support Maintenance Company
FWD - Forward
KM - Kilometer
MNT - Maintenance
PLT - Platoon
UMCP - Unit Maintenance Collection Point

Figure 3. Battlefield Spares System

that maintenance activities have the right parts to perform assigned tasks, and BSS provides a solution to current MOS 76C (Equipment Records and Parts Specialist) shortfalls.

Where Do We Go From Here?

Many things must happen to make BSS a reality. Policy changes must occur to allow for the BSS stockage philosophy. Automated system software must change and, in some instances, be totally replaced. Some new automation hardware is likely to be needed, and better communications equipment, particularly for data transmission, is required. The entire 76-series career field is being revised now. The revision will meet the need for a professional parts orderer. The Quartermaster Center and School must also collect data on all weapon systems and key vehicles. BSS developers need worldwide consumption data, to include exercises, to ensure that STA gets a fair chance to work. Finally, BSS must be evaluated in a real setting with one or more divisions. None of these things are easy, but they are all necessary to develop the effective, efficient and affordable repair parts supply system the Army needs.

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MOBILITY CONTAINERS FOR THE FUTURE

David E. Fleming

With today's lighter, more mobile supply system, units must have a way to ship and store equipment and supplies in a ready-for-issue configuration. This system must be ready for both strategic and tactical missions. This ready-to-issue system must use currently available transportation. The system must also interface with all current and proposed automated systems for asset visibility, such as the Standard Army Retail Supply System (SARSS), Standard Property Book System-Redesign (SPBS-R), Department of the Army Movements Management System-Redesign (DAMMS-R), Logistics Applications of Automated Marking and Reading Symbols (LOGMARS), and Microcircuit Technology, Logistics Applications (MITLA) chips.

Military strategists say that more capable weapons and the sheer lethality of modern warfare will mean that future wars will last only days or weeks. Thus, the old adage that victory goes to the soldier who gets there "fastest with the mostest" gains added credibility. Our recent experience in Operation Desert Shield is an example of this philosophy, where initial deploying units purposely moved with as many supplies as transportation assets allowed.

The U.S. Army Quartermaster Center and School, Fort Lee, VA, is in the final phase of developing a future logistics support system known as the Mobility Container (MOBCON) System that promises to meet modern warfare requirements. The MOBCON will significantly impact on the Army's ability to logistically support future battles by being flexible, deployable, transportable, maneuverable and survivable.

Background

The first phase of the MOBCON program began in 1987 with the Family of Containers. There were two key components of this family: the Forward Logistics Exchange (FLEX) Pallet and the U.S. Air Force's fiberglass Unit Deployment and Storage Container (UDSC). This equipment was added to the Common Table of Allowance (CTA) 50-909. The FLEX Pallets and UDSCs were a midterm solution to the Army's authorized stockage list (ASL) and prescribed load list (PLL) mobility problem. The FLEX Pallets were designed for the heavy divisions and ground forces deployed in Germany, and the lightweight UDSC as a "quick fix" for the rapid deployment, airborne, air assault and light infantry division forces.

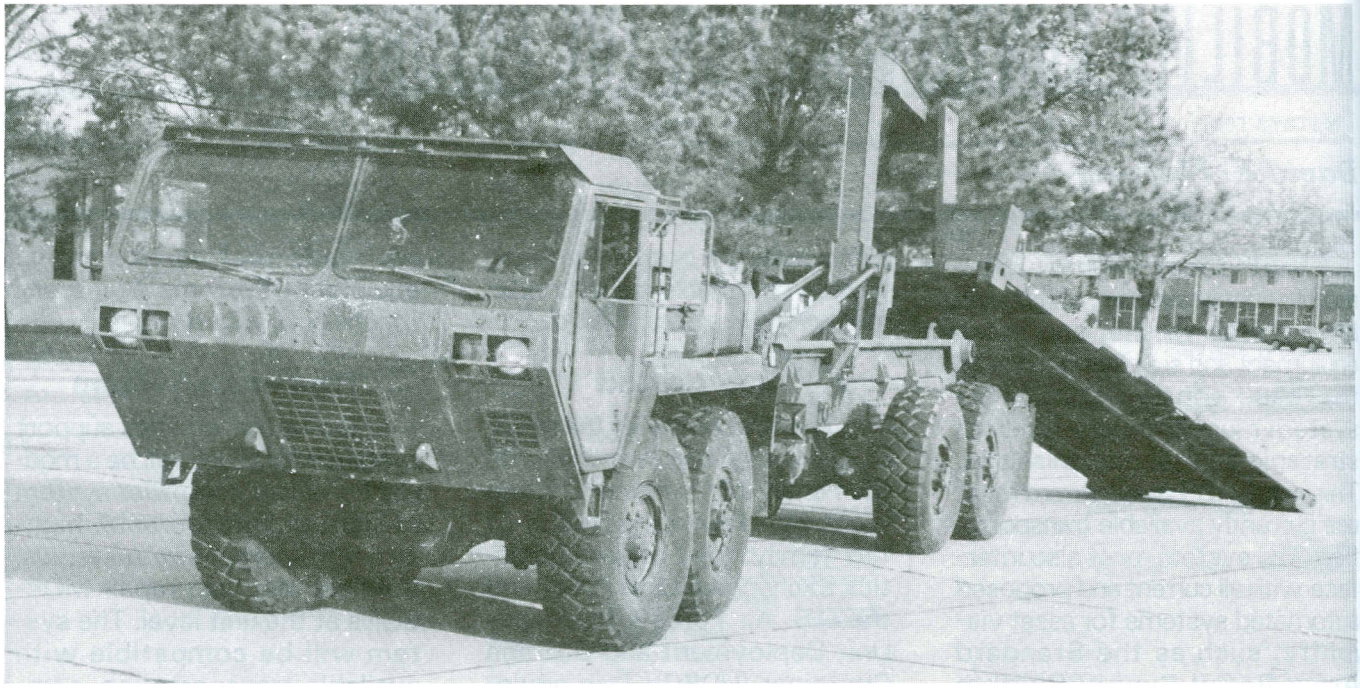
The second phase standardized the European version of the FLEX Pallet through reverse engineering, elimination of health hazards, safety problems and other undesirable characteristics. FLEX Pallets have been improved, and prototypes are currently undergoing technical and user testing. The new FLEX Pallet could be available for fielding as soon as fourth quarter FY 91.

Changing technology, threat and the emerging Department of Defense Standard Containerization policy (which requires compatibility of unit deployment containers with the American National Standards Institute (ANSI)/International Organization for Standardization (ISO) has made seeking alternative equipment systems necessary for the future battlefield.

The Future System

The future logistics support system, MOBCON, will be a modular container and pallet system of lightweight, durable, high-strength, composite materials. Soldiers also can repair MOBCONs at the unit level. The system will be compatible with available transportation, combat off-loadable, externally air transportable and capable of transportation and delivery using both manned and unmanned aerial insertion systems. Composites and light metals will keep the system lightweight. Future MOBCON systems will be made of recyclable and biodegradable materiels. The Army anticipates returning damaged pallets and containers to the manufacturer for disposal or reprocessing as new items.

The MOBCON will reduce unit deployment times and expand resupply options with both ground and aircraft transportation systems, including internal/external helicopter transport. The system has several variants. These variants of MOBCON will provide ISO compatibility with environmental and physical protection of container contents in storage (warehouse and field environments) and in transit (air, water, highways and rail) modes. The variants will be transported in various ways that include the Palletized Loading System (PLS), rail, sealift, rotary wing and fixed wing aircraft.



The palletized loading system is the primary ground transportation system for all subsystems of mobility containers (MOBCON).

MOBCON Preview

The MOBCON will enable combat, combat support (CS) and combat service support (CSS) units to completely upload "PLL/ASL" stocks, equipment and unit basic loads to allow for day- to-day operational requirements and for rapid deployment tactically as well as strategically.

The MOBCON consists of three subsystems:

- Forward Logistics Support System (FLSS)
- Unit Deployment Container - Airmobile (UDC-A)
- Internal/External (INTEX) Helicopter Transportable Cargo Pallet

Forward Logistics Support System

The FLSS will be a family of containers and pallets configured in unit-type modular loads. The FLSS will lock together in a "building block" fashion for stacking, lifting or transporting as a unit pack module. It will be capable of being sling loaded individually or into arrays up to four units for aerial resupply operations. The FLSS will have removable shelves and storage drawers/bins with adjustable dividers and will conform to ANSI/ISO standard.

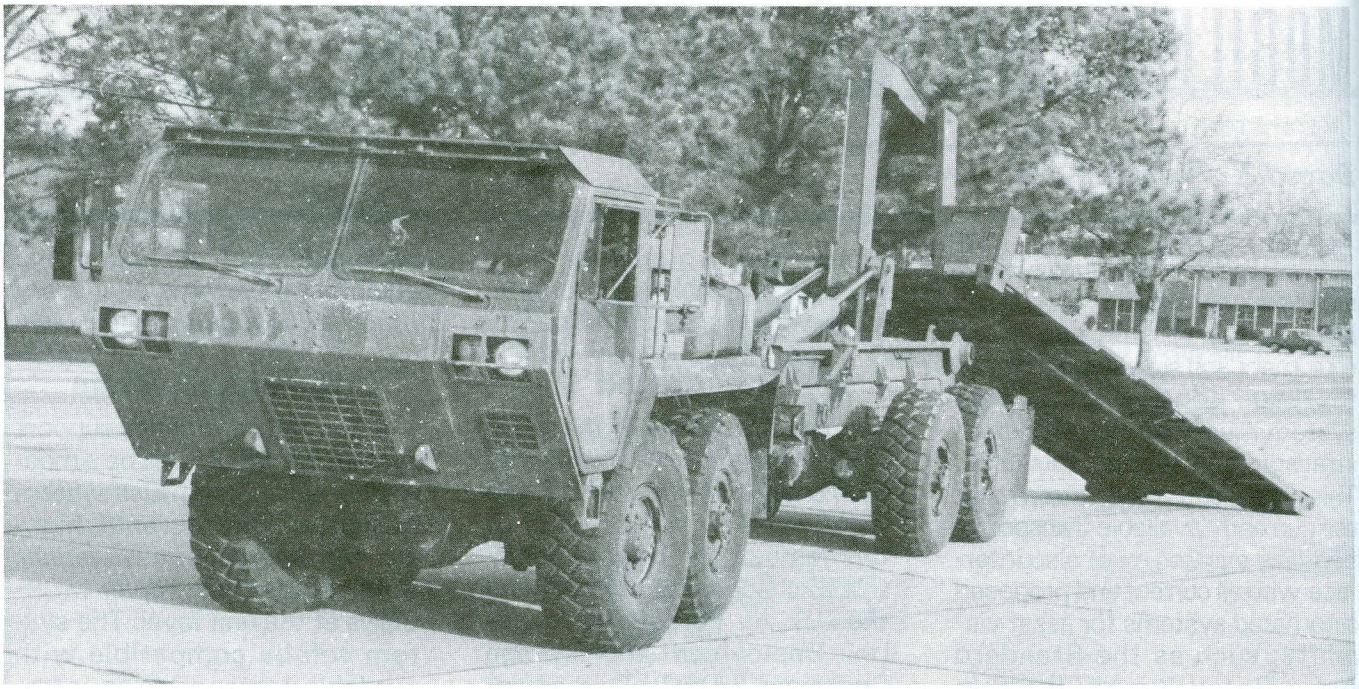
The "enclosed" pallet versions of the FLSS will have collapsible side walls that will fold down onto the pallet base and will accept four to five other collapsed pallets and containers on top. This feature will mean decreased transportation volume on the empty return trip.

Unit Deployment Container - Airmobile

The second subsystem, UDC-A, will be used for internal airlift/helicopter-slingable transportation supply tasks. The basic dimension of the UDC-A will be 108 inches long by 88 inches wide with a variable height of 60 inches to 90 inches and a cargo capacity of 5,000 to 10,000 pounds. The cubic capacity of the UDC-A will range from 240 to 400 cubic feet. It will primarily be employed by aviation maintenance units to store spare parts, tools and other equipment required to sustain 24-hour aviation maintenance operations. The UDC-A will enable combat, CS and CSS units to preload equipment as necessary to allow for rapid deployment to and around the battlefield. The UDC-A will replace the X-4, a 200-cubic-feet-capacity, fiberglass container currently used by aviation units. Although specifically targeted as a replacement for the X-4 container, the UDC-A is a general-purpose container suitable for storing and transporting all classes of supply.

INTEX Cargo Pallet

The INTEX cargo pallet, the last subsystem, will be an improved version of the Air Force's 463L (88 inches by 108 inches) cargo pallet with four-way forklift pockets. The pallet will be equipped with four, sling attachment points on its corners, or it will be sling loadable by the cargo tie-down net attached to its perimeter rings. The INTEX will have a rated capacity of 10,000 pounds for both internal and external airlifts. It will be owned by the



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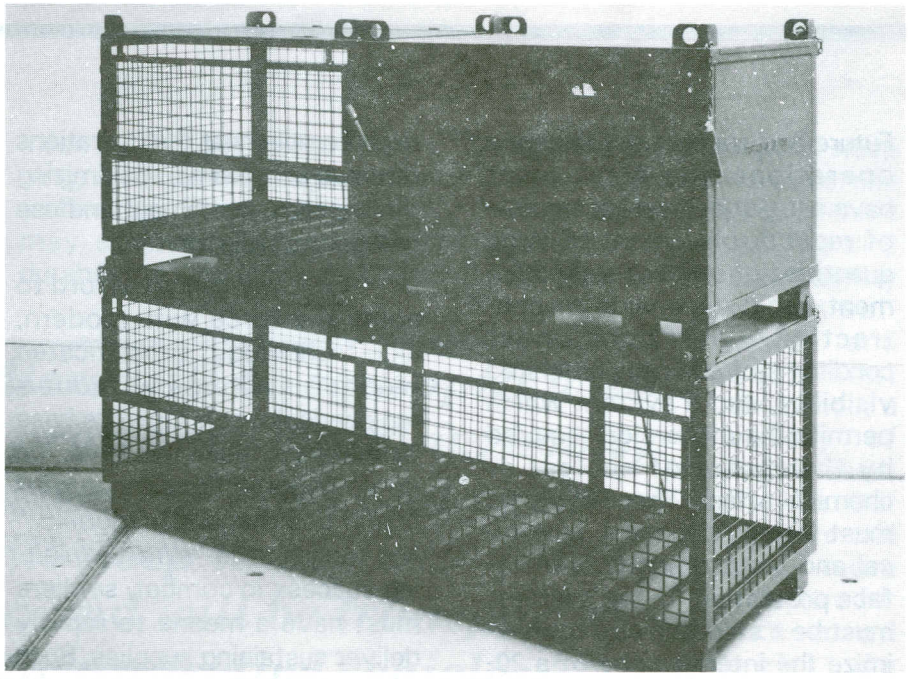
Army and used for rapid throughput and disbursement of combat-palletized loads for supply and resupply. This unique pallet will be suitable for movement of palletized cargo loads through the entire system from a continental United States (CONUS) supply depot to a unit in the field without multiple reconfigurations.

Current MOBCON Status

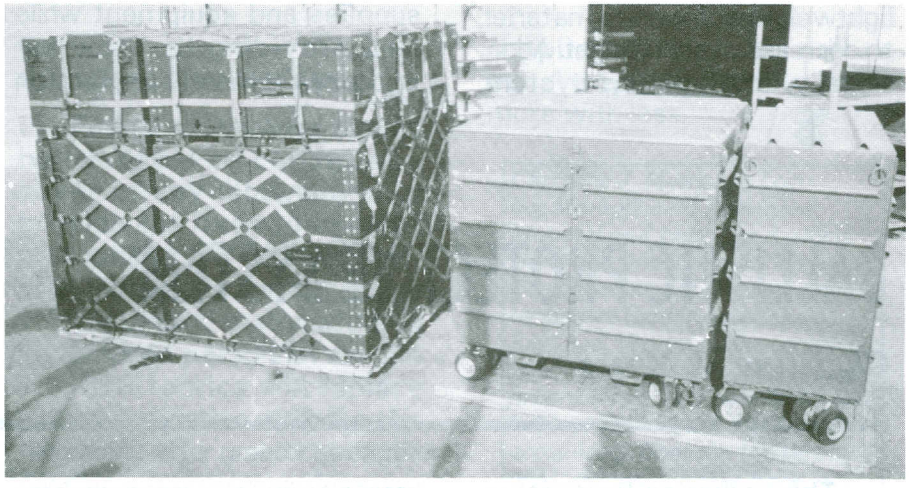
The Operational and Organizational Plan for the MOBCON was approved on 21 September 1989. A draft required operational capability (ROC) document is currently being staffed for worldwide comments. Following approval of the ROC, variants of the MOBCON will be type classified, and procurement action will begin to field the MOBCON.

The U.S. Army Troop Support Command's Belvoir Research, Development and Engineering Center, Fort Belvoir, VA, is currently the materiel developer for the future FLSS. Developers are investigating the best way to incorporate the most desirable characteristics of the FLEX Pallet, the U.S. Marine Corps' Quadruple Container, the Palletized Container (PALCON) and the TRICON - Multipurpose Equipment Shelter into the design of a lightweight FLSS. The new FLSS will be fielded in FY 98. The U.S. Army Aviation Systems Command (AVSCOM), Aviation Applied Technology Directorate (AATD), Fort Eustis, VA, is the materiel developer for the UDC-A and the INTEX Cargo Pallet. Over 1,000 of the first generation UDC-As have been locally procured by select units of the XVIII Airborne Corps. The UDC-A will be fielded within all aviation maintenance units during FY 94-97. The INTEX pallet is currently undergoing technical testing and is scheduled for fielding in FY 94.

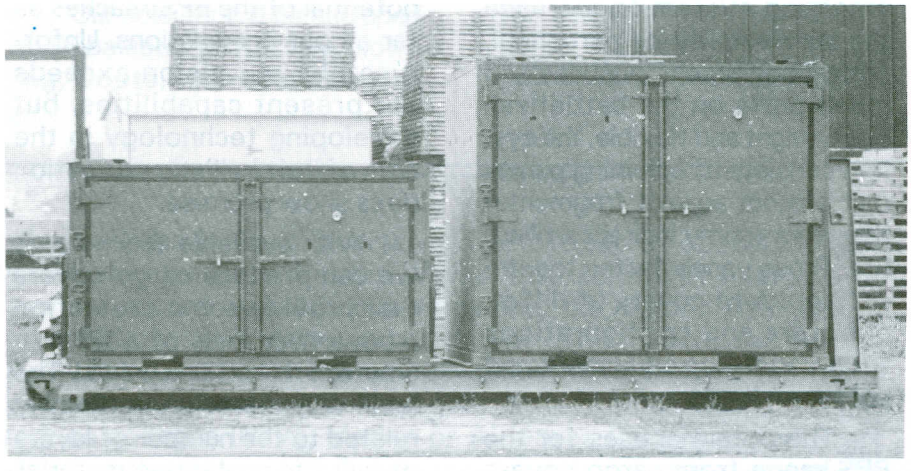
To win the AirLand Battle-



Phase I - Forward Logistics Exchange (FLEX) Pallet



Phase I - Unit Deployment Storage Container (UDSC)



Phase I - Unit Deployment Container - Airmobile (UDC-A), 60 Inches and 90 Inches in Height, Uploaded on a Palletized Loading System Flatrack

Future and support contingency operations, the Army must have a logistics system capable of rapid displacement of large quantities of supplies and equipment, rapid expansion or contraction, operations under conditions of darkness or limited visibility, and a system which permits the dispersion required by the threat of nuclear or chemical attack. These systems must include chemical, biological and electromagnetic interface protection. These systems must be a standard size to maximize the interior cube of a 20-foot ISO container, in addition to being constructed from a lightweight composite materiel to decrease overall weight. Additionally, the logistics system must complement the operations of small unit teams, maximizing the supplies, equipment and use of logistics skills forward.

The Army cannot afford to equip the force with modern, high-technology, sophisticated weapon systems without a rapidly deployable logistics base to maintain these systems. To do so negates the concepts of "rapid deployment," "mobility" and "deep battle." When exploiting success in combat, soldiers must have a means to rapidly deliver sustaining supplies. Such a logistics support system must be capable of storing all classes of supplies and equipment while also providing the security and environmental protection required on the AirLand Battlefield-Future.

NOTE: For additional background information on authorized stockage list mobility, see "Class IX Mobility Overview" in the Winter 1989 edition of the *Quartermaster Professional Bulletin.*

David E. Fleming is a Logistics Management Specialist, Materiel and Logistics Systems Division, Directorate of Combat Developments, U.S. Army Quartermaster Center and School, Fort Lee, Virginia. A retired Sergeant Major, he has over 30 years experience in various troop and staff positions, at both retail and wholesale levels.

BALLISTIC PROTECTIVE SYSTEM

Christine J. Myers

The Ballistics Protective System (BPS) is a versatile, emerging system to increase the survivability of personnel, critical equipment, supplies and repair parts on the battlefield. Lightweight and flexible, the system consists of adjoining panels that protect against fragmentation from enemy indirect artillery fire. These panels fasten together to produce covers of different sizes and configurations for a variety of equipment and palletized loads.

The potential uses for the BPS range from cargo covers and interior vehicle reinforcements to ballistic tents, shelters and even airplane hangars. The potential of the BPS reaches as far as our imaginations. Unfortunately, our vision exceeds our present capabilities, but developing technology in the area of soft ballistic protection does show promise.

With available technology, we can produce cargo covers that provide some protection from a near miss of a 155-millimeter (mm) artillery round. The level of protection is directly related to the number of layers of ballistic protective material. Therefore, the higher the degree of protection, the greater the weight. Today's technology can produce a ballistic cover for the required level of protection, but that cover would be very bulky and heavy.

The U.S. Army Natick Research, Development and Engineering Center, Natick, MA, is already working on future BPS needs with research on producing synthetic spider silk fiber. Spider silk has 5 to 10 times the tensile strength of steel and can be stretched about 18 percent without breaking. According to Natick researchers, synthetic spider silk technology will be

"ripe" within the next 5 to 10 years. Industry also is developing soft ballistic protection. The two leaders in this technology, E.I. DuPont De Nemours and Company and Allied-Signal Inc., are continually upgrading and expanding their products of Kevlar and Spectra, respectively. Other sources for BPS technology are competitively working on research and development. These midterm prospects for BPS are very encouraging. Within the next 10 years, BPS will be lighter, more flexible and able to achieve a higher level of protection. The BPS can then be used for tents and shelters. Perhaps synthetic spider silk will replace nylon for parachute canopies and camouflage netting. A lightweight ballistic fabric could also be used for sleeping bags, field jackets and battlefield dress uniforms. The Soldier Integrated Protective Ensemble (SIPE) under development by the U.S. Army Infantry School at Fort Benning, GA, will investigate this technology. These applications may save costs by adding durability to individual clothing items and may serve to lighten the individual soldier's load.

'Our soldiers will be equipped with ballistic protective clothing, boots, helmets, sleeping bags and backpacks; will sleep in ballistic protective tents; and will be transported in ballistic protective vehicles.'

Future technology should be available to construct a cover of any dimensions to provide the desired level of protection. The BPS will provide the means for any cargo vehicle to be transformed into an armored personnel carrier. The BPS fabrics will replace many nylon, cotton and polyester fabrics and offer greater strength, durability and enhanced survivability.

Our soldiers will be equipped with ballistic protective clothing, boots, helmets, sleeping bags and backpacks; will sleep in ballistic protective tents; and will be transported in ballistic protective vehicles. The BPS will enhance the survivability of our soldiers and equipment throughout a variety of wartimescenarios. Our soldiers will be more effective for extended periods because of their equipment and supplies. Thus, our soldiers, our Army will be able to do more with less.

Christine J. Myers is a Logistics Management Specialist, Materiel and Logistics Systems Division, Directorate of Combat Developments, U.S. Army Quartermaster Center and School, Fort Lee, Virginia. She completed an upward mobility training program in September 1990. She holds an associate's degree in accounting from the University of Maryland, College Park, a bachelor's degree in economics from Indiana University of Pennsylvania and a master's degree in business administration from Boston University.

CORRECTION : One of the three methods for a Quartermaster officer to obtain Military Education Level-4 (MEL-4) credit was incorrectly quoted in the Winter 1990 edition in an article on "Command and Staff College Options" submitted by MAJ John Angevine, the Majors' Assignment Officer of the U.S. Total Army Personnel Command, Alexandria, VA. For officers selected for the resident course by a Department of Army Selection Board, the majority attend the U.S. Army Command and General Staff Officer's Course at Fort Leavenworth, KS. Each year, two to three Quartermaster officers attend one of the sister service colleges (Navy, Marine or Air Force Command and Staff Colleges). The article incorrectly stated that the majority of Quartermaster officers attend one of the sister service colleges. The *Quartermaster Professional Development Guide* details the selection process.

CITY POINT: THE TOOL THAT GAVE GENERAL GRANT VICTORY

CPT Robert O. Zinnen, Jr.

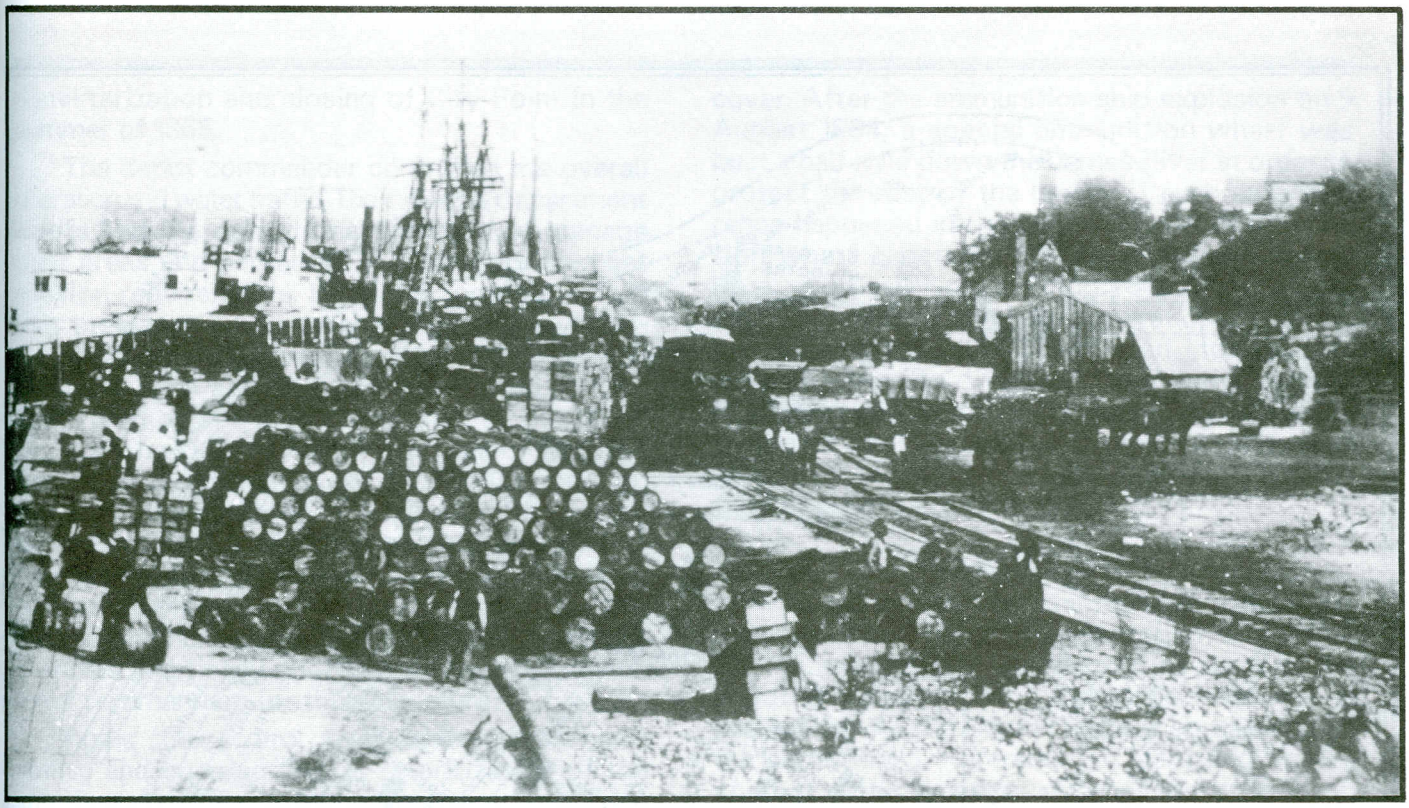
A person standing on the banks overlooking this harbor and the massive facilities surrounding it would have been amazed at the sights and sounds. A vast fleet of ships stretched as far as the eye could see. The harbor's port facilities consisted of eight huge wharves with a city of warehouses and support buildings capable of unloading 25 ships daily. The thundering sounds and smoke of the trains, awaiting their cargo transfers straight from the ships or disappearing towards their destination, would have caused the observer to cover his ears and squint. This person would have stood in awe at the functioning of this tremendous operation and the 10,000 personnel who made it one of the busiest harbors in the world.

It was not one of the huge port facilities in World War II or Inchon Bay in 1950 or even Cam Ranh Bay during the Vietnam Conflict. This place was the Union advance supply depot at City Point, VA, situated deep in the heart of the Confederacy, only 20 miles from the Southern capital of Richmond. From the end of June 1864 to May 1865, City Point provided all supplies necessary to support the 125,000 men and 65,000 animals of General Ulysses S. Grant's Union Armies which lay siege to the strategically important town of Petersburg, VA. General Grant gave his highest praise to City Point and the Quartermaster personnel who ran this critical operation by stating: "There has been no army in the United States where the duties of quartermaster have been so well performed." City Point, rarely mentioned in the numerous volumes on the Civil War, proved to be a vital factor which enabled General Grant and his Union armies to force General Robert E. Lee and his Confederate Army to surrender and end this brutal war between brothers.

Fully understanding and appreciating the importance of the supply depot at City Point requires grasping the events which led General Grant to order the creation of this modern port and the second largest city in Virginia during the time of its operation. President Abraham Lincoln and his advisors knew that to prevent the destruction of the country, the North must militarily force the seceding states back into the Union. Strategically, this mandated that the Federal forces take the offensive. From the beginning of the Civil War in 1861, the Union forces were numerically and logistically superior to the Confederate forces defending their capital of Richmond. However, this bloody and savage struggle raged into 1864 with little or no possibility of the war ending. The Southern commander, General Lee, and his Army of Northern Virginia had become legendary by continually defeating the Union forces and preventing the capture of Richmond, only 120 miles south of Washington. General Lee and his army inflicted major losses upon the Union armies and their commanders, such as at Fredericksburg in 1862 and Chancellorsville in 1863.

If the Confederate forces had suffered defeats of this magnitude, the war would have been over much earlier. After each campaign, the Union forces would quickly replace losses in men and equipment and appoint a new commander. The North's ability to sustain such losses stemmed directly from its vast and continually growing industrial base and its population that was three times larger than the Southern states. As the war progressed, the Union forces became stronger and better equipped with the latest in military weapons and technology. However, at the same time the South was becoming weaker and slowly bleeding to death. The Confederacy's ability to wage war diminished with each victory because of no significant industrial complex and a small population. Even from the beginning of the war, the South lacked the resources to take the general offensive which the North continually pressed against the South with little success. General Lee's invasion of the North in 1863, which was brutally repulsed at Gettysburg, PA, amounted to a raid with the intention of defeating the Union Army in the open away from the defenses at Washington.

In 1864, President Lincoln suffered under the weight of tremendous political pressure over the now long and costly war. He desperately sought an aggressive general who could wield the powerful Union Armies and finally force the South to succumb. Fortunately, the president looked to and appointed General Grant, the conqueror at Vicksburg to command the massive Union Armies. Grant knew that the South could not replace its losses and changed the strategic objective from taking Richmond, to destroying Lee's army. In May 1864, Grant started his campaign of attrition and marched south. Grant's forces would

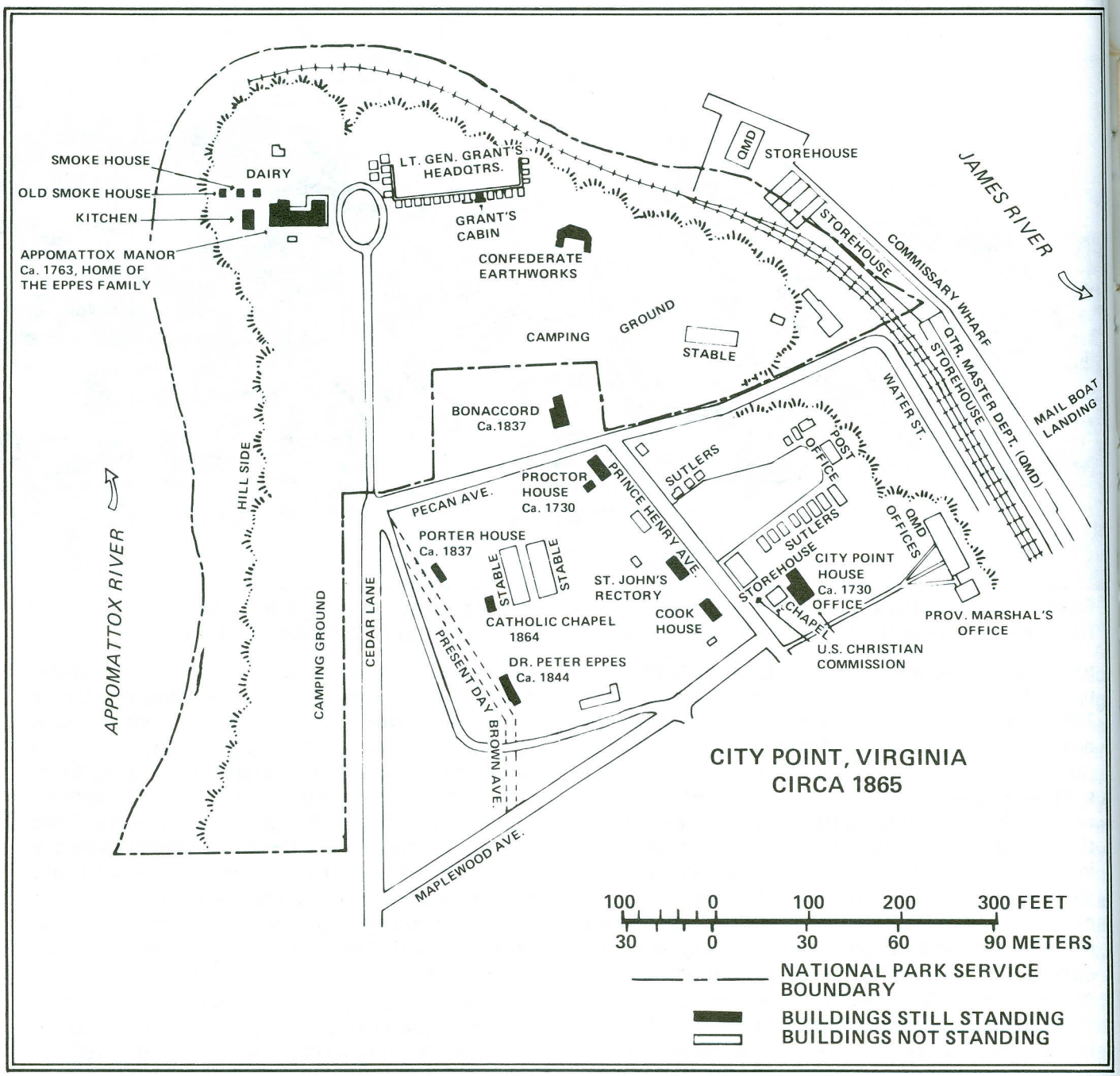


Barrels of potatoes and salt pork and boxes of hardtack piled on huge wharves at City Point harbor came straight off ships and onto rail cars traveling directly behind Union lines.

maintain the initiative and force constant combat upon Lee's shrinking army until its surrender in April 1865. Grant's method of warfare represented an entirely new concept for the Union. For the previous three years the Union Armies retreated northward after each defeat or at the coming of winter. As this campaign progressed southward through the spring and early summer, it resulted in the extremely brutal battles of the Wilderness and Cold Harbor, VA, with their unbelievably high casualties. By June, Grant realized that Lee would not leave Richmond and its almost impregnable defenses. Grant recognized that a direct assault on Richmond would result in tremendous casualties and offered little opportunity for destroying Lee's army. Consequently, Grant marched his armies farther south with the intent to capture the city of Petersburg with its critical transportation networks. If Petersburg fell, Richmond would starve and thus force Lee's Army of Northern Virginia out into the open, where the vastly superior Union forces could destroy it. However, by the end of June, the Union forces failed to take Petersburg, and Grant ordered the siege of this small city.

Throughout history, the great battle captains, such as Alexander the Great and Napoleon, understood the importance of logistical support in winning a campaign. Grant fully grasped the significance of logistics and its impact on combat effectiveness. Throughout his numerous campaigns in the Civil War, the general planned for and built supply depots to ensure that his operational plans did not fail because of inadequate supply support. Conversely, the Union commander believed that his opponents would fail if he could sever their supply lines. As a direct result, on 18 June 1864, Grant ordered his Chief Quartermaster General, Brevet Major General Ingalls, to create a supply depot at City Point capable of supporting the forces participating in the siege of Petersburg. General Ingalls created a supply depot previously unparalleled in military history, a supply depot capable of supporting an army of 500,000 soldiers and supporting animals and equipment.

The supply depot at City Point supported the Union forces better than at any time during the war. City Point grew into an extremely efficient and diverse supply depot of over 280 buildings capable of providing all the support services necessary to keep a world-class army combat-effective. The port facilities consisted of eight wharves covering over eight acres with warehouses totaling over 100,000 square feet of the wharves. An intricate rail network of over 22 miles of track spanned from the wharves to directly behind the Union lines. During the campaign, the track grew together with the Union siege lines to transport over a half million tons of supplies directly to the combat units. City Point provided unequaled Class I (rations) support to the Union Army such as fresh meat and over 100,000 loaves of fresh bread daily. The massive repair shop located at City Point maintained the force of over 5,000 wagons and the 60,000 animals necessary to sup-



port Grant's army. During the siege of Petersburg, the first-class hospitals built at City Point became capable of treating 15,000 wounded with medical care unsurpassed in a field environment. For Grant to control the entire Union military machine, a highly efficient communication system was created at City Point that allowed Grant effective communication with not only Washington, but all of the Union forces throughout the country. To fully appreciate the importance and magnitude of this extremely complex and intriguing support center, a number of the major areas which made City Point function so smoothly will be described in detail.

Command and Control

The creation of City Point with its impressive support capabilities in less than 30 days represents an achievement second to none in prior military history. City Point was a credit to all who built it and made it run so effectively. However, a vast amount of the praise should be levied upon Brevet Major General Ingalls, the Chief Quartermaster of the Armies operating against Richmond. Ingalls' leadership provided constant guidance, support and a mixture of stringent control and autonomy for the different departments. The City Point depot was actually under the command of COL P. P. Pitkin until November 7, 1864, when he accepted the position as Quartermaster General of the state of Vermont. Pitkin's successor, COL George W. Bradley, ably held the position of depot commander until the end of the war and the subsequent

demilitarization and closing of City Point in the summer of 1865.

The depot commander controlled the overall operation and water traffic. The individual department chiefs had the operational freedom to manage their areas and personnel as necessary to meet mission requirements. However, Ingalls dictated that the depot commander submit a daily transaction report listing all of the receipts, issues and balances. The actual supply operation at City Point worked under the principles of the "Pull" system. The Quartermaster Generals of both the Armies of the Potomac and James submitted on the 25th of each month a detailed list of the requirements for the next month. Before this submission, these "realistic" supply requirements started at the regimental level, were passed to the next higher echelon using the Quartermaster channels and finally ended up on the desk of the army commanders for their signature.

Ingalls' strict control greatly assisted in accountability and ensured proper prioritization of the supplies. Nothing left City Point without prior authorization from General Ingalls. As the siege became more permanent, the efficient management and operation of City Point matched with the improved rail and road network allowed the supplies to go directly from the depot to the brigade supply areas. In addition, the actual supply system response time for a request dropped to less than 24 hours and only a few hours in an emergency situation.

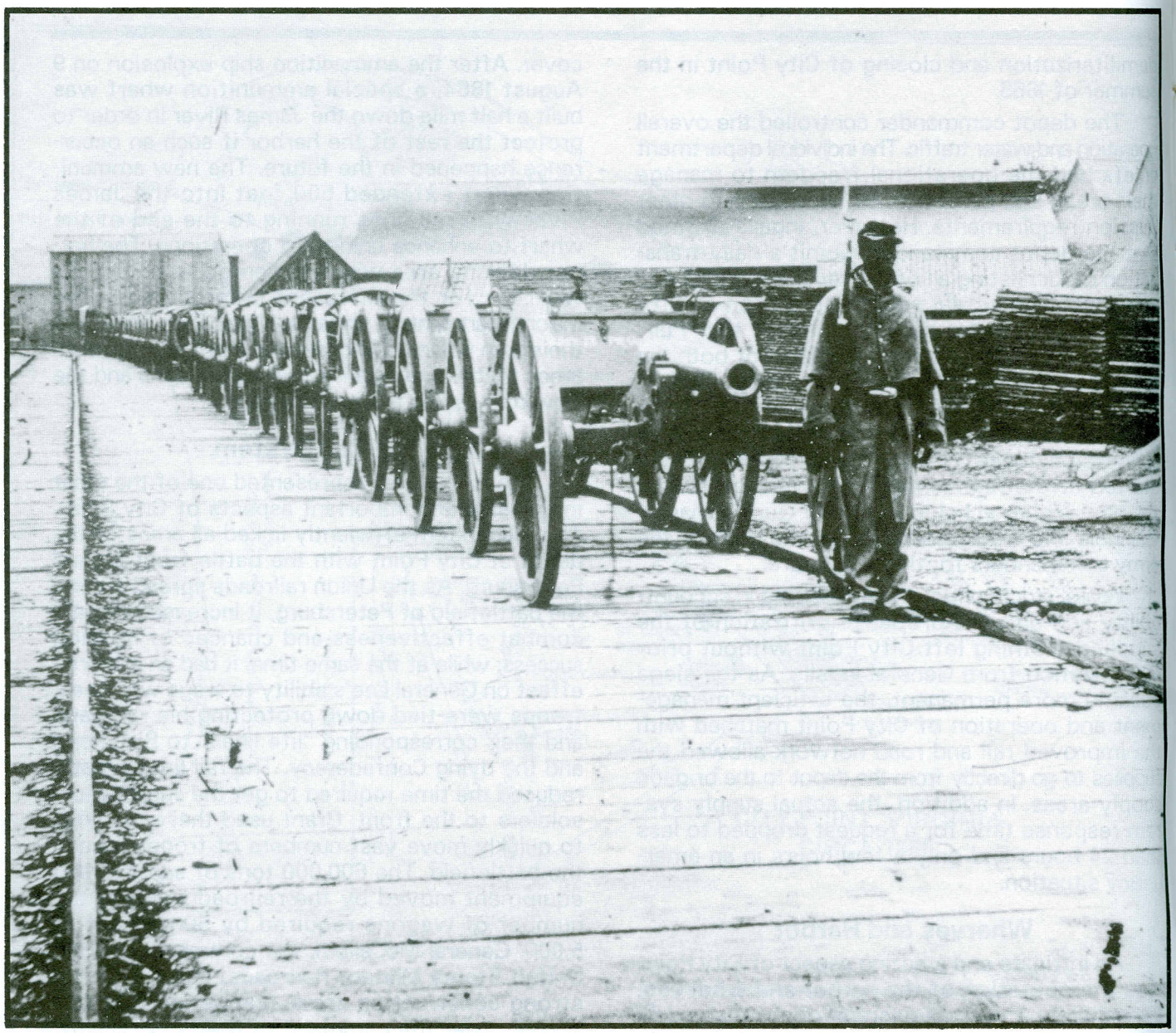
Wharves and Harbor

An intricate and amazing aspect of City Point was the operation of the harbor and wharves. Immediately, the small decrepit docks that existed at City Point started receiving supplies, while the construction crews created the facilities that made City Point one of the busiest harbors in the world. By 1 August 1864, the wharves facilities and warehouses were complete and operational. At any one time, anywhere from 150 to 200 ships anchored off City Point awaiting their chance to unload cargo. Over 390 ships worked routinely between City Point and the other Union ports and supply centers. The facilities permitted cargo to be loaded straight from the ships to either railcars or wagons. The rail network which spanned all of the wharves was completed by 5 July. The 3,000 wharf workers consisted of mostly freed slaves. The number of ships that could be unloaded each day varied anywhere from 2 to 25 based on the size and type of cargo.

The wharves extended eastward along the southern banks of the James River for over half a mile. The wharves facilities covered over 350,000 square feet or 8 acres with almost 2 acres under cover. After the ammunition ship explosion on 9 August 1864, a special ammunition wharf was built a half mile down the James River in order to protect the rest of the harbor if such an occurrence happened in the future. The new ammunition wharf extended 500 feet into the James River with rail lines running to the end of the wharf to enhance unloading operations. The harbor docking area was segmented into specific wharves for the different commodities. The major departments, such as the Repair Shop, managed their own wharves in order for them to control all areas that may influence their operations and the flow of supplies to the soldiers.

The Rail System

The rail system represented one of the most impressive and important aspects of City Point. The rail system efficiently linked all areas of the depot at City Point with the battle front around Petersburg. As the Union railroads spread around the battlefield of Petersburg, it increased Grant's combat effectiveness and chances of mission success; while at the same time, it had an adverse effect on General Lee's ability to wage war. Lee's troops were tied down protecting his railroads and their corresponding "life lines" to Richmond and the dying Confederacy. The rail lines greatly reduced the time required to get the supplies and soldiers to the front. Grant used these rail lines to quickly move vast numbers of troops around the battlefield. The 600,000 tons of supplies and equipment moved by the railroad reduced the number of wagons required by 50 percent or 5,000. General McCallum, the commander of the United States Military Railroads, ensured that a strong construction crew, numbering 900 personnel under the command of MAJ E. E. Wentz, immediately started work at City Point after the order was given to create the depot. The railroad construction crews built the majority of the depot at City Point. The original plan for the depot at City Point called for temporary facilities and likewise were built in that manner. Consequently, as the siege continued, the construction crews were forced to reinforce the wharves and buildings. By 2 July 1864, the construction crew finished rebuilding the 5 miles of track to Petersburg that existed before the war. A few days later, these industrious crews completed the track connecting the different areas of City Point depot. These first class railroad facilities included a large engineer house and turntable. As the Union siege works grew southeast of Petersburg, the construction crews built the rail lines behind the Union lines. Eventually, the rail lines stretched 22 miles around Petersburg. Throughout the distance of the track, the crews built stations, sidings and platforms which increased the speed of distribution and



Rail lines running to the end of a special 500-foot ordnance wharf made loading cannon and their carriages easier and safer for transport to the front.

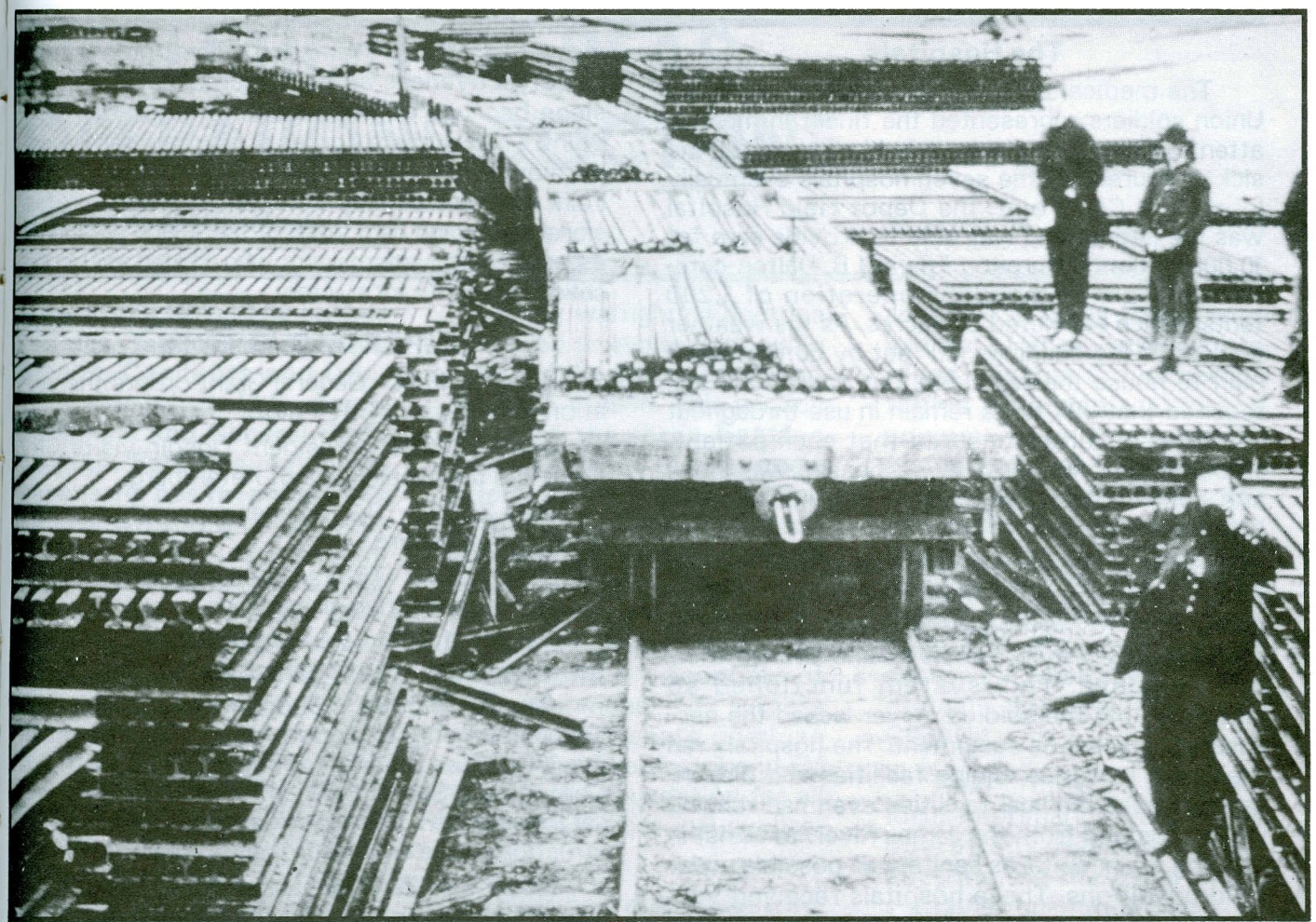
reduced the amount of handling necessary to get the supplies in the hands of the front line soldiers. As many as 24 locomotives were used to transport troops and a daily average of 1,400 tons of supplies from City Point to the front lines. On the return trip, the trains carried the sick and wounded back to the hospitals located at City Point.

The Repair Shop

An extremely vital department at City Point was the complete repair depot created and commanded by Brevet LTC E. J. Strang. The repair depot performed the maintenance on the wagons, carriages and the other pieces of major equipment. Another important mission effectively managed by the repair depot centered around the receiving, recuperation and issuing of the horses and mules required by the Union armies in siege of Lee's Army of Northern Virginia. The repair depot work list numbered over 1,800 carpenters, wheelwrights, blacksmiths, saddlers, teamsters and corral hands. The repair shop operated its own wharf, due to the tremendous work load. The repair depot wharf covered 190 feet of waterfront and consisted of 26,000 square feet of storage space. The different shops of the repair depot were contained within six large buildings which covered almost 17,000 square feet of work space. LTC Strang's depot repaired 3,653 wagons and 2,414 ambulances. The depot shod 19,618 horses and 31,628 mules. This department issued 31,386 horses, 18,891 mules, 1,536 wagons and 370 ambulances. Strang even sent repair teams consisting of blacksmiths, carpenters and wheelwrights to different units at the front lines to shod and repair equipment.

Subsistence

Throughout military history, the topic most complained about by the soldiers was the food



Stacks of railroad construction material grew when General Grant ordered the rail line at City Point rebuilt and extended as his siege line expanded.

that they were issued and often ate only to survive. But, the Union forces fighting around Petersburg received the finest food support that an army of that time period ever had in a field environment. The subsistence mission at City Point included feeding the approximately 65,000 horses and mules. To accomplish this important task of feeding the armies and supporting animals, it mandated extensive planning and communication between the Quartermaster Commissary personnel at City Point and the support personnel at the front. The Commissary Department at City Point was commanded by Captain Benedict.

The standard ration during the Civil War varied dramatically based upon a constantly changing menu, the food actually purchased and the food available at the front. For planning purposes, the standard ration, three meals per day, during the siege of Petersburg was roughly three pounds consisting of the different food groups. The standing operating procedure (SOP) required that 30 days of rations for personnel and 20 days of rations for the animals be on hand at City Point. Consequently, at any time at City Point 10,800,000 meals or over 16,000 tons of food could have been found in the large commissary storage facilities. The forage SOP mandated that the animals receive a daily ration of 26 pounds of food and based on the "on hand" requirement of 20 days this meant 33,800,000 pounds or nearly 17,000 tons of food was stored at City Point. in addition, the troops regularly received fresh meat in their rations. City Point maintained two weeks rations or 2,500 head of cattle within its compound and another herd about the same size across the James River. A major morale builder for the troops came in the shape of fresh bread. The bakery section produced over 100,000 loaves of bread daily. Often, the bread was loaded straight onto the trains and reached the troops while still hot.

Both the food (Commissary) and forage areas operated their own separate wharves and storage areas. The Commissary Wharf or Wharf #2 spanned 581 feet of waterfront and covered over 40,000 square feet. The Commissary department stored a vast portion of the rations in the nearly 27,000 square feet of storage space provided by the three warehouses located on the wharf. Wharf #4 or the Forage Wharf covered 630 feet of the waterfront and provided 71,000 square feet of storage space with nearly 17,000 feet of covered storage. The Commissary and Bakery section possessed another depot site located in the eastern section of City Point. This compound consisted of 7 buildings covering 22,933 square feet of operating space.

The Hospitals

The medical care received by the wounded Union soldiers represented the finest in medical attention that that time period had to offer the sick or injured. Of the seven hospitals eventually located at City Point, the Depot Field Hospital was the largest and was able to provide care for 10,000 patients. Surgeon Edward B. Dalton commanded this tremendous operation of 1,200 tents, which blanketed 200 acres. As the weather cooled, 90 log buildings, 20 feet by 50 feet were built to house the wounded, but operations still required that 324 tents remain in use throughout the winter. Nurses ensured that each patient, who had his own bed and washbasin, was clean and comfortable by regularly providing clean linens and clothes.

These hospitals represented self-contained cities. They operated their own supply system very similar to the modern day network. The hospitals requisitioned, received and stored their own supplies. This system functioned so smoothly that the soldiers never lacked the necessary medicine or equipment. The hospitals ran their own laundries, dining facilities and dispensaries. These medical facilities even had running water, pumped from the James River, to assist in keeping the hospital as sanitary as possible under field conditions. These hospitals received vast amounts of assistance from civilian agencies such as the Christian Commission and the U.S. Sanitary Commission. These agencies provided fresh and canned fruit to help lift the health and morale of the soldiers. Each Corps had their own Sanitary Relief Station consisting of two wagons. These relief stations issued 100 tons of canned tomatoes, 1,200 barrels of cucumbers and 17,000 cans of Sauerkraut. The soldiers at City Point even had a lemonade stand to quench their thirst. Usually, two or three ships, loaded with goods supplied by these civilian commissions, sat at City Point waiting to unload their "treats."

Conclusion

On June 18,1864, Grant ordered the first of the many huge forward supply depots that the United States would build in the next 125 years in order to wage war on foreign soil. The U.S. is building modern depots, similar in mission to City Point, to support the American forces in Saudi Arabia. The facilities built at City Point surpassed all such compounds built previously in military history. This depot allowed Grant to maintain the initiative and continue his offensive operations around Petersburg which enabled him to achieve his objective of forcing Lee's Army of Northern Virginia out of its defensive positions. The facilities gave Grant the ability to mass his forces, move quickly and strike hard. The Union's combat effectiveness actually increased during the siege because of the support provided by City Point. The Southern forces during this same period slowly starved to death. The success of City Point stemmed directly from the leadership, professional ability and hard work of the 10,000 personnel, especially the Quartermasters, who created and ran this critical factor in Grant's victory.

IMPORTANT EVENTS

June 18,1864 - General Grant orders the creation of a depot at City Point.

June 21,1864 - President Lincoln visits City Point and the battlefields of Petersburg.

July 2,1864 - The rail lines repaired and operating to Petersburg.

July 5,1864 - The rail lines completed within the depot connecting all sections.

August 1,1864 - Wharves and warehouse facilities completed (reinforced in late fall).

August 9,1864 - Shortly before noon, an ammunition ship exploded killing 43 and wounding 126. After the war, records revealed that a Confederate Secret Service Agent, John Maxwell, set the explosion. This explosion resulted in the construction of the special ordnance wharf.

November 26,1864 - Large forage shortage. This shortage represented the only major supply deficiency during City Point's operation.

January 24,1865 - Confederate fleet attempts to raid City Point. Most of the fleet runs aground. Two ironclads make a desperate attempt to push through to the supply center. One gunboat is sunk and the other mysteriously turns around.

March 25,1865 - Confederates attack Fort Stedman. The objective of the last offensive action of the South was the supply depot at City Point. if destroyed, the loss of City Point would have forced the Union to retreat northward away from Richmond.

April 2,1865 - Union captures Petersburg.

April 9,1865 - General Lee surrenders the Army of Northern Virginia.

April 9,1865 to the end of the summer of 1865 - City Point used to resupply the Armies heading North after the war. The equipment and animals captured from the South were reissued to the Southern soldiers. The Union animals and equipment at City Point were sold to the public.

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EVOLUTION OF REAR OPERATIONS DOCTRINE

LTC Ronald G. Rada

Editor's Note: The author is Chief, Tactical Operations Branch, Concepts and Doctrine Division, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas. He has responsibility for the writing and dissemination of rear operations doctrine. This article seeks to clear up the current confusion surrounding terms used when discussing rear operations doctrine.

Misunderstandings about rear operations exist Army-wide. This discussion of the evolution of rear operations doctrine is an attempt to correct this situation. I encourage using current terms instead of outdated doctrine and terminology in magazine articles, unit standard operating procedures (SOPs) and operations plans (OPLANs).

AirLand Battle doctrine first appeared in the 1982 version of FM 100-5 (Operations) and introduced three battles: **close, deep** and **rear.** This change in the Army's basic warfighting doctrine generated the need for developing rear battle doctrine. Publication of FM 90-14 (Rear Battle) in 1985 met this need. Before FM 90-14, units in the rear referred to FM 31-85 (Rear Area Protection).

FM 90-14 was a giant leap forward for all units operating in the rear. This field manual created the force structure and equipment changes to make the rear operations doctrine functional. However, shortly after publication of FM 90-14, Army of Excellence force structure constraints did away with the "rear battle structure."

Army warfighting doctrine continued to evolve with publication of the current version of FM 100-5 in 1986. This version changed the three **battles** (close, deep and rear) to **operations** in the overall AirLand Battle. This slight change has not been universally understood. **Close operations** bear the ultimate burden of victory or defeat. **Deep and rear operations** are economy of force operations; their success eventually impacts on close operations. The doctrine in FM 100-5 is the foundation for all subordinate doctrinal publications.

Rear operations doctrine has been included in FM 71-100 (Armored and Mechanized Division Operations (How To Fight)) and FM 100-15 (Corps Operation), which superseded the division and corps "rear battle" doctrine found in FM 90-14. The echelon-above-corps portion of FM 90-14, the only part still current, must be considered in light of the latest FM 100-5. When FM 100-7 (The Army in Theater Operations) is published, the rest of FM 90-14 will be superseded.

These changes in doctrine have made many terms for rear operations obsolete. All outdated terms should be deleted from subordinate doctrinal publications, unit SOPs and OPLANs. The terms **rear area protection** (RAP), **rear area combat operations** (RACO) and **rear area security** (RAS) disappeared from the Army's vocabulary shortly after FM 90-14 appeared. The term **rear battle**, now also obsolete, appeared in many forms: **rear battle officer, rear battle plans section** (on numerous tables of organization and equipment) and **rear battle element.** Simply replacing the term **rear battle** with **rear operations** is not possible because the terms are not interchangeable. Therefore, a thorough understanding of current rear operations doctrine is necessary when revising subordinate doctrine, SOPS and OPLANs.

Rear battle doctrine focused primarily on **security operations.** Rear operations doctrine, on the other hand, contains four functions: **sustainment, movement, terrain management** and **security.** All functions of rear operations are interrelated (Figure 1). When planning or conducting one of the functions, commanders and staffs must consider all of the other functions; thus, they synchronize rear operations. This is the responsibility of the **rear command post** (CP) at division and corps and the **rear tactical operations centers** (RTOCs) at echelons above corps.

For those familiar with FM 90-14, **the rear battle officer** was selected by the echelon commander based on mission, enemy, terrain, troops and time available (METT-T). Rear operations doctrine places the responsibility of the rear operations commander on the assistant division commander for support (ADCS) and the deputy commanding general (DCG) at corps. The echelon commander may still appoint

the officer responsible for rear operations based on the situation, but the ADCS and DCG are the key positions in terms of doctrine. The underlying intent of designating the deputies as the rear operations commanders is to ensure that sustainment commanders do not divert their focus from their primary sustainment missions.

Current doctrine also outlines various changes in force structure which have taken place or will take place shortly. At corps and division, the rear CPs are composed of three cells: **headquarters** (HQ), **combat service support** (CSS) and **operations** (OPS). The OPS cell is a Reserve Component unit that is further augmented by divisional or corps resources. It *replaces* the **rear area operations centers** (RAOCs) at those echelons. The forward deployed forces already have this new force structure in place and have been training with the new units for over a year. Stateside forces are scheduled to receive the new force structure during FY 92.

At corps, the rear CP is further augmented by four RAOCs (only type of RAOC left in doctrine) which are subordinate CPs. Their primary function is terrain management within their **areas of responsibility** (AOR). They also direct Level I threat responses, coordinate Level II and III responses and monitor lines of communications (LOC) and sustainment operations within their AOR. The corps RAOCs are not under the control of **corps support groups** (CSG) but will colocate with a CSG or military police (MP) battalion whenever possible for ease of coordination, life support and security. At echelons above corps, RAOCs have been replaced by RTOCs at area support groups (ASG) and the theater army area command (TAACOM). FM 100-7 will give further doctrinal guidance to echelons above corps.

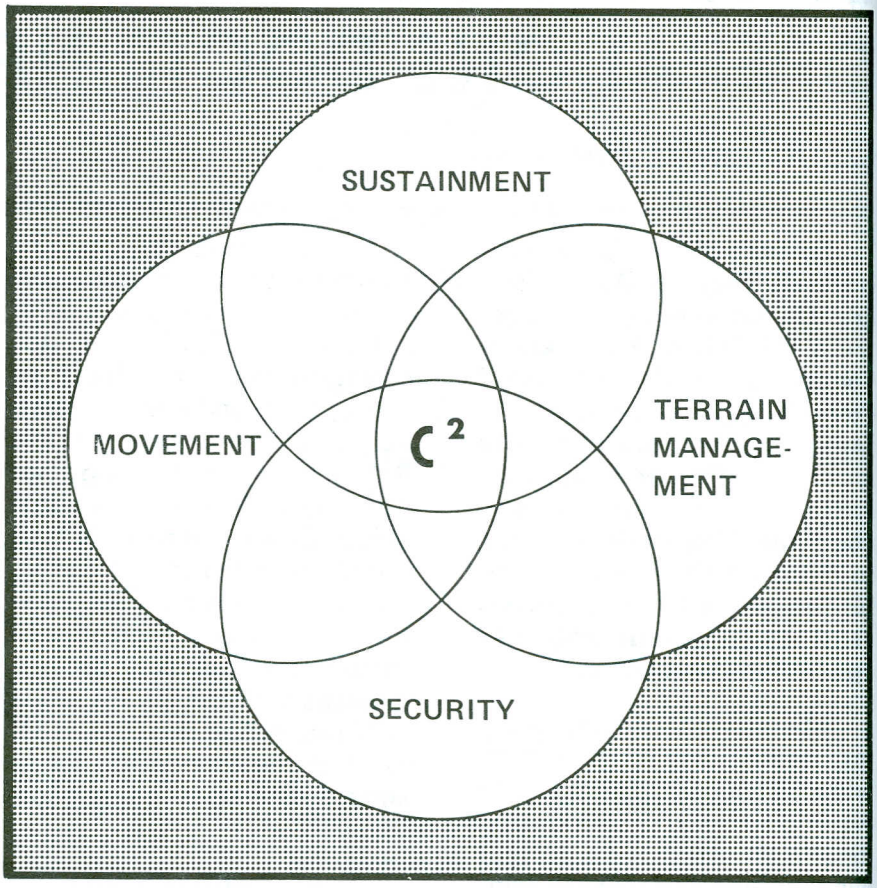

Figure 1. Rear Operations Functions

Another evolutionary change occurred in how the rear area threat is addressed. The levels of threat found in FM 90-14 have evolved into **threat response levels.** The threat response levels reflect a graduated response to threats in the rear area and are not based on the size or type of threat force. Units positioned in bases and responsible for defending themselves are **base defense forces.** If a threat exceeds the capability of base defense forces, assistance is requested from **response forces** (usually MP units). If a threat exceeds the capability of available response forces, the rear operations commander requests the commitment of tactical combat forces (TCF).

This discussion should provide a better understanding of current rear operations doctrine. This article provides a basis for updating subordinate doctrinal publications, unit SOPs and OPLANs. The tactics and techniques manuals for divisions and corps, which are being written, will provide the "how to" for rear operations. We seek comments from the field to ensure that our doctrinal publications are sound. Forward comments and recommendations for the development of rear operations tactics and techniques to: Commander, Combined Arms Command, ATTN: ATZL-SWW-D, Fort Leavenworth, KS 66027.

ARCTIC PETROLEUM OPERATIONS: THE COLD FACTS

CPT James R. Hamby *CPT William I. Rush*

Assignment to the arctic. These words often conjure up many different expectations of service in an arctic region. In summer months, operations are highlighted by continuous daylight and a climate much like the New England states. Then, with only a few weeks notice, autumn has come and gone and winter has set in for the next six months or so. Now you are truly in the "last frontier" and your outlook on military operations is guaranteed to change.

The most formidable enemy in the arctic is the **COLD**. It affects fuel consumption rates and the soldiers' abilities to perform their mission. The cold also increases the time required for missions. Finally, it tests equipment to the outer limits of performance capabilities.

With the onset of winter comes snow, continual darkness, snow, cold weather that often borders on the extreme and more **SNOW**. Winter is the time to practice what you have been sent north to do: provide petroleum, oils and lubricants (POL) support for tactical operations in an arctic environment. While the mission remains the same as in any other region, the climate dictates the need for specialized procedures and specialized equipment. Without specialized equipment, the unforgiving surroundings will prevent your unit from completing its mission - sustaining the maneuver units depending on you for fuel.

Arctic temperatures require some special considerations when planning POL support. The temperature extremes of -30 degrees Fahrenheit dictate that many vehicles must increase idle time so that they do not freeze and are operational when needed. While no magic formula for increased fuel consumption exists, many experienced arctic soldiers use an additional 20 percent usage factor for temperatures below -30 degrees Fahrenheit. The overall use of idling time can vary with extremely cold temperatures and the tactical situation.

The arctic temperatures will also require using stoves (Yukon and potbellied) continuously for field deployment. The preferred fuel for stoves is motor gasoline (MOGAS) because it burns cleaner and hotter than diesel fuel. Also, MOGAS will not congeal in arctic temperatures. Most resupply will be pumped into the user's five-gallon cans. The cans will then ready to mount on platforms for use with stoves. This distribution is convenient for the customer but increases the transfer time at the fueling point. Today's inventory of powered equipment largely depends on diesel fuel. As a result, the gasoline stove will use the most MOGAS and should be considered when planning the consumption rate.

Currently, jet petroleum fuel (JP8), the Army's all-purpose fuel, does not contain the additives needed for arctic use. Arctic diesel fuel or diesel fuel arctic (DFA) contains additives to prevent congealing at low temperatures. Presently, even DFA can fall victim to temperatures below -60 degrees Fahrenheit. In these extreme temperatures, bulk storage tanks, pumps and hoses can be warmed by makeshift covers heated by "Herman Nelson" heaters or similar equipment. When available, heated warehouses or similar structures help keep the DFA from congealing.

AR 70-38 (Research, Development, Test, and Evaluation of Materiel for Extreme Climatic Conditions) defines several categories of cold. According to the regulation, intermediate cold ranges from -5 degrees Fahrenheit to -25 degrees Fahrenheit. Cold ranges between -35 degrees Fahrenheit and -50 degrees Fahrenheit. Extreme cold ranges between -60 degrees Fahrenheit and -70 degrees Fahrenheit. At intermediate cold temperatures, five gallons of MOGAS will fuel a Yukon stove for approximately 10-12 hours. This furthers breaks down to about .4 gallons per hour per stove. At cold temperatures, five gallons will last about 6-8 hours, which translates to approximately .7 gallons per hour per stove. At extreme cold temperatures, a five-gallon can will last about 4-5 hours, which breaks down to about 1 gallon per hour per stove. These planning factors are based upon experience gained during field exercises with combined temperatures ranging from + 20 degrees Fahrenheit to -80 degrees Fahrenheit.

A major consideration in planning arctic operations is that the cold significantly reduces the soldier's ability to complete even routine tasks. Any job that takes the soldier outside of a warm area will increase the time required for a given task by a

Any job in the Arctic requiring a soldier to be outside of a warm area increases the time to perform that job by a factor of five.

factor of five. For example, the time to set up a fuel distribution point increases from three hours to 15 hours. Built into this factor of five is the time that each soldier needs in a warming shelter to combat the effects of cold on the body. Also figured into this time factor is the loss of manual dexterity due to arctic mittens and the bulkiness of cold weather clothing.

Most maneuver units in arctic or subarctic regions use specialized vehicles for mobility over snow. The 6th Infantry Division (Light) in Alaska uses the M973 Small Unit Support Vehicle (SUSV). The lightweight, tracked SUSV maneuvers through snow and over difficult terrain. Presently, SUSVs are allocated mainly to combat arms units. This allocation sometimes limits support capabilities because the wheeled POL vehicles do not maneuver as well in snow and rough terrain. Keeping POL vehicles on established roadways is a major consideration in deployment and site selection. While many open areas exist, they are often inaccessible in the summer and in the winter. Warm temperatures in arctic regions thaw the ground, resulting in swampy areas called muskeg. This spongy surface limits vehicle traffic and severely hinders movement on foot. The winter months bring snow which accumulates both through natural snowfall and wind drifts. The open areas have more snow drifts and deep snow becomes a planning problem. Forces that operate in arctic regions must rely on heavy engineer assets to clear snow-covered roadways, make new roadways and clear proposed operation sites. Combat support (CS) and combat service support (CSS) elements, particularly, depend on engineer assets because of their equipment. In addition to clearing roads, engineers often construct snow berms to shield support equipment. Berms are necessary because the frozen ground (permafrost) severely limits the ability to dig in equipment. Face-to-face coordination with supporting engineers before Army arctic training is an important measure for the support unit commander.

Deployment and site selection often is limited to locations accessible only over properly constructed and approved ice bridges. Before selecting a forward refueling site, the logistician must verify that any ice bridges that must be crossed are certified to support the weight of vehicles moving forward. The problem expands when warmer temperatures lessen the effectiveness of previously sound bridges. The slope of ice bridge banks is an additional consideration, depending on the vehicles for use forward.

The challenge of properly concealing a unit's activities increases by the nature of the terrain. Camouflage of refueling sites differs slightly in the arctic because of so much snow. While most units in cold regions are supplied with snow camouflage nets, the nets are suitable only if the camouflage site is in an open area. Using snow-white camouflage nets in a green patchy area exposes the site to detection because it stands out as a pure white circle in green surroundings. The solution is to use woodland camouflage with snow camouflage in wooded or scrub-wooded areas.

Extreme cold weather creates an exceptionally dry climate. This dryness increases the static electricity in the air and makes grounding procedures all the more significant. Grounding becomes difficult with permafrost but is imperative for safety. If securing a good ground is impossible, the soldier must ensure a proper bare metal-to-bare metal bond to equalize the static charge between two vehicles. As in all POL operations, the best solution is both a good ground and a positive bond to prevent fire hazards.

The arctic temperature extremes can exceed the design specifications of military equipment. While environmental tolerances of equipment are improving, some situations require initiative to overcome cold weather obstacles. As an example, the current fuel hose in the Army inventory, although used in the arctic, is not rated for temperatures exceeding -25 degrees Fahrenheit. At this temperature the hose becomes stiff and brittle, and at -40 degrees Fahrenheit the hose becomes inflexible and impossible to use. A developmental hose rated for the arctic has been tested for cold weather and remained pliable to temperatures of -40 degrees Fahrenheit. Since such temperature extremes are common during the arctic winter months, this military hose is only slightly better than the one currently used in all regions. To combat the lack of a good arctic-rated hose, a hose designed in Alaska for regions with such extreme temperatures can be fabricated for military use. This hose will remain flexible to -60 degrees Fahrenheit. The 6th Supply and Transport (S&T) Battalion at Fort Wainwright, AK, procured the hose through

local purchase in January 1989 and reported excellent results at temperatures of -60 degrees Fahrenheit and below.

Another concern is the fuel system supply point (FSSP). The Army's version becomes brittle at temperatures near -20 degrees Fahrenheit. During storage in its "coffin," the FSSP's bag develops creases along the folds. When the storage bag is unfolded in extremely cold temperatures, the creases crack and make the bag unserviceable. This concern led to developing an arctic fuel system supply point (AFSSP). This system will serve as a bulk fuel receiving, storage and issuing facility for the immediate resupply of units. The AFSSP is designed for operating in field conditions in temperatures as low as -60 degrees Fahrenheit. The AFSSP will be available with 3-thousand-gallon, 10-thousand-gallon and 20-thousand-gallon fuel bags. Because of the land area covered in arctic operations, units will be able to order this system with bags of any capacity or in a mix of these capacities. Although this system has only been tested in temperatures down to -33 degrees Fahrenheit, the AFFSP performed well and proved itself more adaptable to the arctic than the FSSP. Currently, the AFSSP is being fielded in Alaska and should be operational in the Winter 1990.

The last component of the arctic fuel dispensing equipment (AFDE) is the arctic forward area refueling equipment (AFARE). The system was designed as a lightweight forward refueling system to refuel all types of vehicles and aircraft. It has been tested to temperatures as low as -35 degrees Fahrenheit with satisfactory results. This system is configured the same as the standardized forward area refueling equipment (FARE). The AFARE, however, can operate in field conditions at cold temperatures better and more reliably than the FARE.

An assignment in the arctic, whether a permanent change of station or simply a short deployment, should be viewed as an adventure as well as a challenge. Overcoming the extreme cold is an experience that will last a lifetime. However, the extreme cold is a formidable enemy and must be conquered through both respect for its dangers and preparation for its challenges. Proper planning and foresight will ensure that Army logisticians fulfill their mission in any environment. The arctic is no exception.

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COMPANY COMMAND: THE FOUR Cs AND THEN SOME

CPT Martin C. Dinan

For a captain in the United States Army there is perhaps no greater honor than commanding a company of soldiers. Yes, it can be challenging, tiresome and rewarding. However, you must remember that at no other time in your career will you have such a strong influence over soldiers and their lives. To be successful in command, we as commanders must do our best to lead with all our energy and take care of our greatest asset: the soldier. If we achieve this, how can we do anything but succeed in any mission?

All of us want to do our best while in command. To succeed as leaders, we must look through the eyes of those being led. It is those junior officers, noncommissioned officers and soldiers within our command who are most influenced by our leadership. What do they expect and deserve from us as commanders?

The biggest problem is that I, along with many fellow junior

officers, do not have a great number of years of experience to draw from. However, many of us have just come from where the "boot meets the pavement": the company level of the Army. We experienced the results of good or bad leadership first-hand. We saw the effects of decision-making, big or small, on the "little guy." We also have access to such professional journals and books as *Company Command: The Bottom Line* by John G. Meyer, Jr., *The Challenge of Command: Reading for Military Excellence* by Roger H. Nye, and FM 22-100 (Military Leadership) along with volumes of other works. So, coming fresh from the "trenches," I offer some insight into what soldiers expect and deserve from their company commanders.

First and foremost, I suggest you ask yourself why you want a command. Is is because you want to lead soldiers? Maybe you do not really want a command, but you need it to "ticket punch" for future advancement? Well, command requires your willingness to dedicate yourself 24 hours a day, seven days a week, to your unit and your soldiers. There is no half-stepping with regard to this commitment. The bottom line is: you have got to want it. You must want to command more than anything else in the world. Do not think that you can fool the soldiers under your command. They can see a self-server coming a mile away. This type of commander usually micromanages, places the blame for foul-ups on subordinates and downright does the bare minimum to get by. Their soldiers tend to develop poor attitudes. This feeling festers and breaks down unit discipline and performance. Command for self-servers will be an unpleasant experience.

Perhaps one of the best ways to ensure success in command is to simply examine and employ the four soldierly values espoused in FM 22-100. Courage, Candor, Competence and Commitment are the four character traits which must be valued by all soldiers at every level. As a commander you need to be the ideal soldier in the unit. The "four Cs", as they are commonly called, should be your guidelines for command. I have added one other "C" to these values, Caring. It is probably the most important. All of these values are the heart of true leadership. Let us examine how they will affect the soldiers within your command.

Courage

A soldier needs the commander to possess courage. Courage, at the company level, to most soldiers means defending the ideas and actions of the unit. A commander is responsible for everything that happens within the unit. Soldiers constantly watch everything a commander does or fails to do for their unit. If a commander fails to act as a "buffer" between their net and "higher," soldiers will probably start to ask questions. Sometimes you may not agree with a senior's decision that affects your unit. This is when you need to possess courage to explain the decision to your subordinates and then back that decision 100 percent no matter how painful.

Believing in your subordinates and allowing them to accomplish the mission with minimum supervision and guidance is courage. You are allowing subordinates to be creative and feel important. Problems may arise with this leadership technique, however, you must have this courage. At the same time always make sure your standards are met. Assign subordinates small tasks at first. Coach and develop them, and then give them larger tasks. Do not be afraid to acknowledge your mistakes because this is also courage. Just be sure to learn from these mistakes, correct them and march on. Once again, allow your subordinates to make mistakes and grow from them.

A commander needs to practice moral and ethical courage at all times. If something is wrong, correct it immediately. If equipment is not mission-capable, do not hide it. You must have the courage to face reality. Address the problem, and then solve it. Accurate reports and accountability are a must. Your higher commander needs this information in basing decisions for priority of support to your units and others. If you need help with a problem, let higher command know. Lack of courage can make your time in command very difficult.

Candor

The second soldierly quality your soldiers will expect from you is candor. Candor, according to FM 22-100, is "being frank, open, honest and sincere with your subordinates, seniors and peers." The best example of candor is the commander who routinely takes the time to be with the soldiers. It includes talking with soldiers and taking the time to understand them. In understanding the soldiers, you will learn their values, needs and concerns. They will likewise learn about you as a person. Soldiers need to understand your values, needs and concerns. This is where you have a beneficial affect on them. You will be so respected by your soldiers that they will pick up on your frankness, openness and honesty. You will have taught them you are an approachable commander with great candor. Likewise, they will develop this candor. Now is a good time to use some of that guidance you hopefully wrote in your philosophy of command.

Your candor is also needed to provide honest feedback to everyone within your command. Imagine what your soldiers will be like if everything they are told is "sugar coated." Once reality strikes, their trust level will hit an all-time low. This will also happen in relations with your seniors and peers. People do not always want to hear the bad news. However, getting the bad news out in the open and solving the problem is what candor is all about. A good counseling program, incorporating both formal and informal styles, will also promote candor.

Competence

Competence is the most demanding requirement your soldiers will place on you. Proving your competence may further the confidence your soldiers have in you. It also builds their respect, another hard-earned facet of leadership. At first, to prove your competence, sit down and prioritize your missions. The top-notch commander finds out for certain the unit's mission. Then the commander sets goals and lets the unit know those goals and how to accomplish them. This prevents the unit from straying off on distracting tangents.

Then you must be competent in knowing your equipment. This includes what equipment your unit is assigned and its maintenance status. As a prime mover of supplies for support, your equipment must work at all times. You must be an expert in maintenance procedures. This includes training your subordinates to become experts. Not enough emphasis is placed on checking and rechecking the maintenance status of assigned equipment. Remember, General Bruce C. Clarke said, "a unit does best those things which a commander checks."

You should also demonstrate your competence in basic soldier tasks. Always train with your soldiers. Always be first to fire expert on the rifle range. Take your physical fitness test in front of your unit, ensuring they know the standards. Quietly sit in on sessions such as first aid classes and maintenance workshops. Make yourself seen and not always heard. Your soldiers will train to standards because you care and you are competent. Praise the strong instructors openly and take the weak ones aside for more coaching. Training should also improve because word has made its way through the ranks that you may be present.

Your level of competence really boils down to how much time you devote in developing it. As a competent leader you must study your profession. Use all the manuals that apply to your equipment.

Develop a professional reading library for yourself. Study and learn from leaders who have done it all before you. Read works such as *Common Sense Training* by Arthur S. Collins, Jr. and *Company Commander* by Charles B. MacDonald. Also, read any professional journals you can find. Always seek to improve your competence. Enforce a professional development program for subordinate leaders. It does not have to be fancy, just the basics about good leadership and skills development. Such classes could be held in the field or motor pool. When your soldiers notice that they have competent captain in charge of them, you and your unit will reap the benefits.

Commitment

Commitment at the company level means a total dedication to your soldiers around the clock. COL David H. Hackworth summed it up best when he stated, "A commander may issue orders...it is the soldier who makes them happen or does not. He [the commander] forgets that if you want 100 percent from a soldier, you have to give him 200 percent as a commander."

Caring walks hand in hand with commitment. You must care, passionately, about your commitment to the soldiers, the Army, and the ideas and actions they stand for. Caring for your soldiers is most important to a commander. By caring, I do not mean just providing soldiers with hot meals in the field and a clean work environment, although these are important. Caring is a true love for the unit and your soldiers. A commander must express this love by setting high standards and demanding that they be met. This does not mean you coddle your soldiers, either. Caring means you work hard to punish your bad soldiers and give them a chance to improve. It means making all your soldiers feel as though they are needed in your unit to achieve success.

If you truly care for your soldiers, important practices include proper counseling, both to praise and to correct, on a regular basis with documentation. Always support desires for further education, professional and civilian. Also, make training tough and realistic, if you care for your soldiers, to properly and safely accomplish the mission. Lastly, care for the soldiers' families as well. Make yourself available to them, and provide them with information on the unit's schedule and other Army services. Assign sponsors for new soldiers and dependents. Personally welcome them into your unit, and follow up to see they get settled in properly. Send soldiers and families off with a farewell when they move on to a new assignment. That is taking care

of soldiers. Remember, if everything is going well on the homefront, your soldiers will perform better on the battlefront.

In closing, what your soldiers need from you, as a commander, is summarized in an article written by Major Martin E. Dempsey (*Military Review*, November 1987). Major Dempsey explains how a successful commander needs a sense of repose. He states that "repose has everything to do with how a leader creates an environment in which subordinates can develop." For that reason alone he feels it is worth talking about.

Major Dempsey tells the story of how a colonel he served with consistently demonstrated repose. He describes how the officer loved his job and wanted to do it right. "There was an unmistakable sense of completeness about him, as though he had achieved all he had ever hoped to achieve in his career and was not about to let it slip away unsavored....he did not seem in a hurry to get someplace else." It was this commander's belief that all leaders should welcome each experience. A commander should be ambitious, but not in such a hurry to punch all the "right tickets" and wish away the best years of a career. That colonel's positive attitude became the unit's positive attitude; his confidence, their confidence.

Repose, according to Major Dempsey, also requires a great sense of active selflessness. Active selflessness is a giving of oneself on a continuous basis. It is moral courage, loyalty and confidence all rolled into one. It is what soldiers need and expect from you as a commander.

These are confusing times in the Army, times of budget cuts and changing policies affecting everything from promotions to training. The pressure on you as a commander will sometimes seem unbearable. Just remember several things as you prepare for command. First, the soldiers under your command will always be directly affected by your decisions. Do not forget that they are human beings with needs, feelings and emotions. Secondly, give of yourself selflessly in the care of your soldiers, and they will take care of you. Lastly, do not become concerned with "whistle clean" efficiency reports. When you complete your command, be able to look at yourself in the mirror and say, "I am proud because I know I made a difference."

CPT Martin C. Dinan is a 1986 Distinguished Military Graduate of Rensselaer Polytechnic Institute, Troy, New York. He is also a graduate of the Armor Officer Basic, Quartermaster Officer Advanced, Airborne and Petroleum Officer Courses. He has served as a Tank Platoon Leader and Company Executive Officer with 3-68th Armor, Fort Carson, Colorado.

SAFETY SAVES SOLDIERS

SAFETY IN COMBAT DEVELOPMENTS

Adam Janczewski

Have you ever thought that there could be a safer way to work your equipment? Have you ever wanted to make your equipment or procedures less dangerous? Have you ever wondered why they were not changed before? Now you can become part of the solution to a safety problem. The U.S. Army Training and Doctrine Command (TRADOC), Fort Eustis, VA, is taking safety considerations on all equipment very seriously. This command represents the users of Army equipment and is the combat developer for new materiel. TRADOC considers safety early in the materiel development stage. Most TRADOC schools' Directorates of Combat Developments have a system safety engineer whose job is to identify safety problems in new materiel developments. Safety engineering comes early in the equipment design process, before any "metal is bent" or any training occurs. The least expensive time to make changes, and the most effective way to control a hazard, is early design against a potential accident. Waiting until the system is fielded to discover a problem can result in enormous costs.

Once the system is manufactured and fielded, training can help eliminate safety problems. Changes of the operator's work methods on the equipment and programs of instruction eliminate the existing hazards. Operators and maintainers train to avoid unsafe situations caused by "built in" problems. Financial realities dictate this approach. It is less expensive to retrain someone than to apply numerous safety-related modifications to the equipment.

Safety engineering efforts start at the beginning of the materiel acquisition process. Safety engineering reviews of acquisition documents help action officers to know what they are asking for and what they think they are getting. This review begins with a System Manpower and Personnel

Integration (MANPRINT) Management Plan (SMMP). MANPRINT deals with six domains: manpower, personnel, training, human factors analysis, health hazards and safety. Safety is the first concern of the safety engineer, but all six areas of MANPRINT are considered because all influence safety and each other. The SMMP is a basic document that spells out how the six domains will interplay in the planned materiel solution. Once that solution is recognized as the way to solve a battlefield deficiency, the SMMP is the first document written. It and other acquisition documents are reviewed by the safety engineer.

An Operational and Organizational (O&O) Plan is the next document reviewed by the safety engineer. This document tells the materiel developer and engineers what the Army needs and how the equipment is expected to operate under various battlefield conditions. This required document gives the program its direction.

As supporting documents and studies are nearing completion, the required operational capability (ROC) paper is written. A System Safety Working Group is established to prepare a System Safety Management Plan as one of those supporting documents. Sometimes the program manager's office establishes that group during the concept evaluation stage. If not, this task falls later to the combat developer and the system safety engineer. The System Safety Management Plan maps out the approach to safety engineering of a system. It is used by the materiel developer, combat developer and the defense industry as a guide to include safety in the final product.

The ROC updates the performance requirements stated in the O&O and further refines the operational needs for the materiel system. The ROC is a binding agreement between the combat developer (TRADOC) and materiel developer (U.S. Army Materiel Command (AMC)) requiring certain design capabilities to meet the equipment's mission. The ROC ends the chain of combat developer documents where safety is addressed.

The reviews involve engineering methods in determining safety problems and solutions. The engineer concentrates on solving problems of systems currently in the Army inventory. Awareness of existing problems and their solutions aids in designing safety improvements into new systems. Later in the development process, a safety engineering method called "energy path analysis" is used. This analysis deals with how physical properties can cause energy buildup, potential severe personal injury and equipment damage. Additional insulation, grounding, shielding of moving components, sufficient ventilation and hearing protection are considered safeguards. These problems are documented in safety assessment reports, updated and formalized to assess and approve the relative level of acceptable risk before each milestone review.

The acquisition executive (Undersecretary of the Army for Acquisition, program executive officer, or program manager) uses safety as one of the criteria to determine if a system will proceed to the next stage of development. Not all hazards can be totally eliminated because of technical or cost reasons. Depending on the hazard's severity and probability of occurrence, the hazard may be judged an "acceptable risk." The risk is considered acceptable if the capabilities of the equipment to meet the mission outweigh the risk of the equipment causing accidents. If the level of risk is not acceptable, alternatives include canceling the project or reworking the solution to design out the hazard. When the ROC is approved, the materiel developer becomes the lead proponent for safety engineering for the system, but the combat developer's safety engineer remains involved with AMC counterparts to monitor the proponent item throughout its life cycle.

Problems sometimes develop after fielding the system. A materiel change, although extremely expensive, may be the only alternative. Materiel changes must be more cost effective than the cumulative cost of the accidents resulting from the safety hazard. An example of an action where the equipment needed help late in its life cycle is the M151-series 1/4-ton utility truck. A roll cage, safety netting and safety belts were added when training was not an effective solution to preventing rollovers. The projected cost of accidents had exceeded the cost of the materiel changes. Understanding the materiel safety process will help you make informed decisions about systems safety at your level of responsibility. The safety process within the materiel acquisition cycle is adaptable to every system. It can be tailored to meet the situational risks and amount of resources committed for any system in the Army. Thus, safety risks to the soldiers and their equipment can be minimized, ensuring mission accomplishment at the lowest possible cost.

Adam Janczewski is a System Safety Engineer assigned to the Directorate of Combat Developments, U.S. Army Quartermaster Center and School, Fort Lee, Virginia. A graduate of the United States Military Academy at West Point, New York, he served 11 years in various staff and troop assignments. Currently, he is completing a Master of Science Degree in systems engineering through the Virginia Cooperative Graduate Engineering Program.

PROFESSIONAL READINGS

The Professional Readings section of the Quartermaster Professional Bulletin is designed to encourage the professional development of all Quartermasters. Titles are selected from the Quartermaster School Professional Reading List, the current Department of the Army Contemporary Military Reading List and other notable sources. Short reviews from the field are welcome.

Company Command: The Bottom Line

COL John G. Meyer Jr., National Defense University Press, Washington, D.C., 1990

Colonel Meyer has written the premier "how-to" of being a company commander. From tips on training, maintenance and ***supply*** to relationships with higher headquarters and subordinates, he offers common sense advice and unites a vast amount of usable information. Written in "plain English," this book should be required reading for all company commanders or those soon to command.

The End of the Line: The Siege of Khe Sanh

Robert Pisor W. W. Newton and Co., New York, 1982

An in-depth study of the siege of Khe Sanh and the events preceding it. While written for the layman, it includes a fairly comprehensive study of the logistics involved in attempting to supply Khe Sanh's defenders, as well as a discussion of the development of LAPES (Low Altitude Parachute Extraction System).

Time for Trumpets: The Untold Story of the Battle of the Bulge

Charles B. MacDonald, William Morrow and Company Inc., New York, 1984

A very readable narrative of the Battle of the Bulge. MacDonald **(Company Commander)** tells the story of the Battle of the Bulge from the strategic level to the foxhole. The book is an impressive historical study but reads like a novel. MacDonald tells the story of the Bulge with a zeal, a zeal born of the experiences of a man who was there...as he was.

The Battle for the Falklands

Max Hastings and Simon Jenkins, W. W. Norton and Company, New York, 1983

The authors are print journalists who accompanied the British task force to the Falklands in 1982. The result is a book that reads well and is one of the better accounts written to date. The U.S. officer may find it relevant because of its commentary on the problems faced by the British of putting a fairly heavy force on the ground, 10,000 miles from home, in a short time - a situation we have seen recently.

The Training of Officers: From Military Professionalism to Irrelevance

Martin L. Van Creveld, The Free Press, New York, 1990

Van Creveld undertakes a comparative analysis of the past and present education and training of military officers in the U.S., France, Germany and the Soviet Union. He concludes with three recommendations for improving the U.S. officer's training, one of which is to establish a single National Defense University for all services. A thought-provoking, readable book.

Military Misfortunes: The Anatomy of Failure in War

Eliot A. Cohen and John Gooch, The Free Press, New York, 1990

The authors attempt to apply a systems (input-process-output) approach to war. Three types of failure are examined: failure to learn, to anticipate and to adapt. These are then applied to five military failures, including the defeat of the 8th U.S. Army in Korea, 1950. Very well-written.

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BATTLE STAFF NCO COURSE

A new course that will train battalion, brigade, division and corps staff noncommissioned officers (NCOs) to manage the day-to-day operations of command posts recently began at the U.S. Army Sergeants Major Academy, Fort Bliss, TX.

NCOs were already learning their specific duties in the existing courses. However, the Battle Staff NCO Course trains NCOs in battalion command posts to function and fight as an effective team. The goal of the course, according to SGM Philip Cantrell, is to show battle staff NCOs that "you can't make a decision in the personnel area without affecting the logistics, operations or intelligence areas, and vice versa. Without a knowledge of how the staff is interconnected, each section operates independently and perhaps at cross-purposes with each other."

The course includes the instruction formerly taught in the 10-week Operations and Intelligence Course and the two-week Personnel and Logistics Course. With an overall reduction in course length, NCOs must complete some required material by correspondence before arrival for the resident phase. Training for the new six-week course begins before the NCO arrives at the school. Six to eight months before course attendance, candidates enroll in the Army Correspondence Course Program (ACCP). After completing the required lessons, students receive a certificate to present to an academy faculty advisor when they report to Fort Bliss for the resident phase.

Candidates for the course must be in the grade of staff sergeant or above and serve in or be on orders to a G1/SI, G2/S2, G3/S3 or G4/S4 position or Readiness Group advisor position. Submit requests for attendance through normal training channels. Point of contact at the U.S. Total Army Personnel Command (PERSCOM) is SFC Dixon, Specialized Training Branch, Enlisted Personnel Management Division at DSN: 221-4585/4586

PWD 'OLD-TIMER'S REUNION'

On 21-22 September 1990 the Petroleum and Water Department (PWD) of the U.S. Army Quartermaster Center and School hosted the 5th Biannual "Old-Timer's Reunion" at Fort Lee, VA. Approximately 350 retired and active duty petroleum and water soldiers, noncommissioned officers (NCOs) and officers were on hand for the festivities. Scheduled events included the traditional unit dedication to a petroleum unit (this year the 2d Petroleum Group which deactivated in January 1991), dedication of a new enlisted petroleum training facility in honor of MSG Elbert Lee Cox who died in the performance of his duties in Italy in November 1989, a social at the Fort Lee Officers' Club, a tour of the current Petroleum and Water training facilities at Fort Lee and a picnic to close out the reunion. "Old-Timers," some who retired from service in the 1950s, came from all over the world to attend. Certificates signed by the ranking attending "Old-Timer," Brigadier General Charles E. St. Arnaud, Commander of U.S. Army Troop Support Agency (TSA), and coffee cups with this year's reunion logo were given to the attendees. The 6th Biannual "Old-Timer's Reunion" is tentatively scheduled for October 1992. To be placed on the "Old-Timer's" invitations list, send your name and mailing address to U.S. Army Quartermaster Center and School, ASTM-PWD-P, ATTN: CPT Davis, Fort Lee, VA 23801-5042.

NEW REPAIR KIT

The repair outfit, collapsible tanks and drums (ROCTAD) is a simple, quick and easy-to-use operator applied repair kit. It is designed to permanently repair rips or tears of up to 12 inches in collapsible fabric tanks and berm liners and punctures of up to 0.05 inches in tanks or drums with adhesive. To date, units indicate that the ROCTAD increases operational readiness and decreases repair costs. The ROCTAD is a Class IX (repair parts) item. Procure the ROCTAD through the unit supply system under the nomenclature of ELASTOMER using national stock number (NSN) 8040-01-248-6104. The kit costs $610 and can repair up to 48 tanks and drums.

QUARTERMASTER BRANCH SAFETY

Branch safety has moved from the Office of Evaluation and Analysis (OEA) to the Office of the Quartermaster General (OQMG). The *Commander's Guide to Accident Prevention*, a safety book developed by the Quartermaster branch safety office, was distributed to Quartermaster units last December. This book includes an up-to-date accident analysis of both Quartermaster branch and military occupational specialties (MOSs). Also included are a risk management guide, a commander's field safety checklist, a battalion command inspection checklist and many other useful safety documents. The accident analysis, both of branch and MOSs, will be updated at least annually. For a copy of the *Commanders Guide to Accident Prevention*, contact M.L. Davis or CPT Starr at OQMG Safety, DSN: 687-5347.

FM 10-280 REVISION

FM 10-280 (Mobile Field Laundry, Clothing Exchange, and Bath Operations) is currently scheduled for revision during FY 91-92. The revised edition will include information on new equipment and procedures.

FROM SQT TO SDT

Noncommissioned officers (NCOs) will soon be evaluated differently for military occupational specialty (MOS) proficiency. The change in evaluation also means a test of common soldier skills for all sergeants through sergeants first class in training and leadership. Effective with the FY 91 test window, the Skill Qualification Test (SQT) for privates through specialists will be eliminated. This will also be the last year for the SQT, as we know it, for Skill Levels 2/4. Members of the U.S. Army Reserve (USAR) will continue to take the SQT for FYs 91 and 92.

All branches are developing an evaluation, now called the Self-Development Test (SDT). The Active Component will take the SDT in FY 92. The SDT will place the burden of training squarely on the individual NCO. This written test will consist of 100 multiple-choice questions on three subject areas. Most questions will remain MOS specific. In addition to the "job skill" questions, NCOs will face an additional 20 questions each on training and leadership from the Field Manual (FM) 100 series. As development continues, local test site officers (TSO) will circulate information. Local education centers have up-to-date information.

GRREG CENTER RESPONDS TO DESERT STORM

In quick response to the shortfall of trained 57F (Graves Registration Specialist) soldiers during the war in the Middle East, the Graves Registration (GRREG) Center developed a training support package (TSP). The TSP consists of some 38 hours of training for nonGRREG ground forces. The subject areas center on the immediate collection, minimal identification processing and evacuation to the rear of war fatalities. Although this training will not award an additional skill identifier or 57F as a military occupational specialty, the TSP fills the immediate training gap in the face of full-scale conflict during Operation Desert Storm.

For information on the TSP, contact the GRREG Center at DSN 687-4673, Commercial (804) 734-4673 or write to the Director, GRREG Center, ATTN: ATSM-GR, U.S. Army Quartermaster Center and School, Fort Lee, VA 23801.

GRAVES REGISTRATION OFFICER COURSE

The Graves Registration (GRREG) Center at Fort Lee, VA, will conduct the Graves Registration Officer Course on the following dates:

CLASS NUMBER	DATES
Class 502-91	11 March-22 March 1991
Class 002-91	22 April-3 May 1991
Class 033-91	19 August-30August 1991

Classes are limited to 25 students. The course is open to officers in all branches of service. All graduates of this course receive the additional skill identifier of 4V. Officers train for command and staff positions requiring GRREG knowledge, responsibilities of a Joint Mortuary Affairs Office of a unified command and supervision of collection point operations. Submit requests for attendance through established training channels.

INDIVIDUAL SOLDIER WATER PURIFICATION SYSTEM

An individual soldier water purification system (ISWPS) is being developed by Belvoir Research, Development, and Engineering Center, Fort Belvoir, VA, for the Army in the field. The ISWPS will enable soldiers to get enough potable water during early stages of deployment, independent operations, isolation from parent unit or disruption of the water supply system. The current iodine tablet provides only limited disinfection and purification of water sources. The ISWPS will use mechanical or chemical means, or a combination of both, to provide safe drinking water from a variety of water sources. ISWPS testing began the first quarter of FY 91.

FIVE-SOLDIER CREW TENT

The U.S. Army Natick Research, Development, and Engineering Center, Natick, MA, and the U.S. Army Quartermaster Center and School, Fort Lee, VA, are developing a five-soldier crew tent (FSCT) for all locations and climatic conditions. Five tents from contractors were tested during September 1989. One contractor is producing 1,000 FSCTs. The tents will be fielded at various U.S. Army Training and Doctrine Command (TRADOC) schools, the National Training Center, Joint Readiness Training Center and the following units as part of a user evaluation to be conducted until 1 September 1991.

24th Infantry Division (Mech)	160	Delivered
3d Bn, 73d Armor, 82d Airborne	20	Delivered
1st Infantry Division (Mech)	130	Delivered
25th Infantry Division (Light)	130	February 1991
6th Infantry Division (Light)	130	March 1991
11th Armored Cavalry Regiment	130	April 1991
U.S. Marine Corps	200	February & May 1991
U.S. Army Quartermaster Center and School	40	Delivered
U.S. Army Natick Research, Development, and Engineering Center	30	Delivered
U.S. Army Test and Evaluation Command	30	Delivered

CONTINGENCY CONTRACTING

The U.S. Army Quartermaster Center and School (USAQMC&S) developed a concept for contracting to support the Army in the field, commonly called contingency contracting. The changing nature of threats and missions facing the U.S. military around the world, coupled with fewer logistics resources, highlight the need for this concept.

Working within existing federal, Department of Defense and Army acquisition regulations, the concept focuses responsibilities for contracting, adds contracting capabilities to division and corps G4 (Assistant Chief of Staff, Logistics) staffs and lists duties and responsibilities of contracting officers and ordering officers. The concept introduces the Contingency Contracting Support Plan (CCSP), a planning mechanism for operational plans at each command. The CCSP ensures consideration of all potential external support resources for contingency deployments: Logistic Civil Augmentation Program (LOGCAP), host nation support and contracting.

Comments received from an Armywide major Army command (MACOM) review are being incorporated in a final draft before submission to the Combined Arms Support Center for approval. The USAQMC&S point of contact is Conrad Brown at DSN 687-4280/1810.

Career Update

ENLISTED BRANCH

LTC James H. Kokolakis
CPT Eric A. Flagg

"WHY DIDN'T I GET PROMOTED...?" is a question often asked on the morning when the results from a Department of the Army (DA) Centralized Promotion List are released. Ideally, all soldiers would be promoted as soon as they demonstrate the ability to perform duties of the next higher grade. Unfortunately, budgetary limitations and managerial constraints do not permit promotion of every qualified and deserving soldier. The Quartermaster/Chemical Branch receives only the information from the promotion board that is published in the promotion standing list. We respond to inquiries about nonselection by analyzing the noncommissioned officer's (NCO's) Official Military Personnel File (OMPF) and analyzing the board's results to determine trends in promotions so that we provide sound career guidance to soldiers.

Specific reasons for nonselection cannot be determined since members of the DA selection board may not divulge their deliberations. Each board member's evaluation is based on a review of a soldier's records under the "whole person" concept. The selection board identifies senior NCOs who were first considered "fully qualified" and then selects the best of the "fully qualified" for promotion according to Army needs.

The question uppermost in a senior NCO's mind is "How do I get selected?" What does it take to be the best qualified of the "fully qualified"? First, the selection rate for sergeants first class (SFCs) and master sergeants (MSGs) is very low. The Army's average for selection to SFC as listed in March 1990 was 11.2 percent. In 1990 the selection rate to MSG was 11.1 percent. For example, the Career Management Field (CMF) 76 Supply and Services, CMF 77 Petroleum and Water and CMF 94 Food Service selection rate to MSG in September 1990 was 19.7, 3.2 and 1.1 percent, respectively.

The number of soldiers a promotion board recommends for promotion is limited by the Army's current projection of requirements to maintain authorized strength by grades. This does not per-

mit selection of all qualified soldiers for promotion. The board members identify the best-qualified soldiers in their collective judgement. Selection of qualified MSGs or SFCs for promotion by their military occupational specialty (MOS) is based on an analysis of projected losses and projected requirements in that MOS. This ensures that the Army inventory by MOS matches authorizations. Now, back to the original question of "How do I get selected?" Fortunately, each of us can take some actions to improve selection potential.

To be competitive, do the following:

- Seek a progressive and diversified growth pattern. Become an expert within your MOS. Remember that no job is too small and no detail too insignificant. Attain and sustain high ratings throughout your service. Ensure that your evaluation reports accurately describe both your job and your performance. The Noncommissioned Officer Evaluation Report (NCOER) is one of the single most important documents reviewed by a selection board.
- Seek leadership positions, especially early in your career. While not a prerequisite for selection in all MOSs, leadership experience helps. Selection boards are not impressed with the NCOs who avoid the tough leadership positions.
- Make every effort to complete the NCO education system courses, including the technical courses conducted by your service school. If you are not selected for resident attendance, complete courses when possible by correspondence study. The message is clear. Military education is important.
- Consider completing a program at a local college or university after duty hours. Visit your installation's education center to have your military training and experience converted to college credits. Civil education has a significant impact on selection potential. Moreover, it shows the selection board you have done something on your own in the way of professional development.
- Strive for self-development and improvement on your own. Once you have completed either a civil or military education program, make sure your transcripts are included in your military records and your OPMF. This is important; it shows you have completed the course.
- Ensure that your OMPF is current and complete. As you approach the zone of consideration for promotion, this becomes even more important. Do not depend entirely on your Military Personnel Office to forward, maintain and keep your file accurate. Request a copy of your microfiche at least three to four months before a board is convened to ensure all data is current, correct and complete. The address is: Commander, USAEREC, ATTN: PCRE-RF-I, Fort Benjamin Harrison, IN 46249-5301. If there are any discrepancies, make sure the records are updated and corrected before the board convenes.
- Update your photograph. Comments from past selection boards indicate that our Quartermaster soldiers fail to understand the importance of their photographs. It is the primary way for a board to determine your military bearing, appearance and physical stature. We frequently see outstanding NCOs with outdated photographs projecting a poor image in wrinkled and ill-fitted uniforms. If you do not like the photograph you have on file, have a new one taken to update your file. Also, have your first sergeant or command sergeant major take a critical review of your photo for discrepancies you may have missed.
- Keep physically fit and make sure that you maintain your body weight well within established Army standards. Soldiers who seem to grow in inches as they gain weight will more than likely make the selection board suspicious.
- If you have any questions about your career development, be sure to discuss them with your chain of command. You can also stop by the U.S. Total Army Personnel Command (PERSCOM), Room 216 in the Hoffman Building, Alexandria, VA. If you cannot visit, then write to us at the following address: Commander, U.S. Total Army Personnel Command, ATTN: TAPC-EPM-L, 2461 Eisenhower Avenue, Alexandria, VA 22331-0454.

In summary, each soldier is his own best career manager. Seek the tough leadership positions. Demonstrate professional competence within all aspects of your military career. Take advantage of military and civilian educational opportunities. Ensure your personnel records and photograph are updated. Achieving these goals will not necessarily assure your selection to promotion. However, you will improve your potential.

LTC James H. Kokolakis is Quartermaster/Chemical Branch Chief of the Enlisted Personnel Management Directorate, U.S. Total Army Personnel Command, Alexandria, Virginia. He is a former Battalion Commander of the 208th Forward Support Battalion, 8th Infantry Division (Mechanized), Germany.

CPT Eric A. Flagg, Deputy Branch Chief and Proponent Officer, is a former Company Commander of Company A, 47th Forward Support Battalion, 1st Armored Division, Germany.

Brigadier General (Ret.) Merrill L. Tribe

Brigadier General (Ret.) Merrill L. Tribe, a distinguished Quartermaster and decorated World War II veteran whose 26-year Army career included a series of high-level Quartermaster assignments, died 4 January 1991 at age 81.

He is the former Commanding General of the Quartermaster Research and Engineering Command in Natick, MA (now the U.S. Army Natick Research, Development, and Engineering Center). His succession of Quartermaster leadership positions during the 1950s and early 1960s serve as examples of historical changes in the structure of the Quartermaster Corps. He retired 30 June 1964 from the Army and began a career in private industry.

Among his major assignments were Commanding General, U.S. Army Research and Engineering Command at Natick, MA; Commanding Officer, U.S. Army Supply Center at Giessen, Germany; Director of Procurement Division, Office of the Quartermaster General , Washington, D.C.; and Assistant to the Director of Staff and Chairman of the Munitions Board, Department of Defense, Washington, D.C. During World War II, he served in France, Germany and Western Pacific Headquarters in Manila, The Philippines.

An attorney, he was commissioned a second lieutenant in 1938 in the Quartermaster Corps, Officer Reserve Corps. BG Tribe was called to active duty as a first lieutenant in February 1942 and was transferred in July 1942 to the Control Division, Headquarters Service of Supply (later named Army Service Forces).

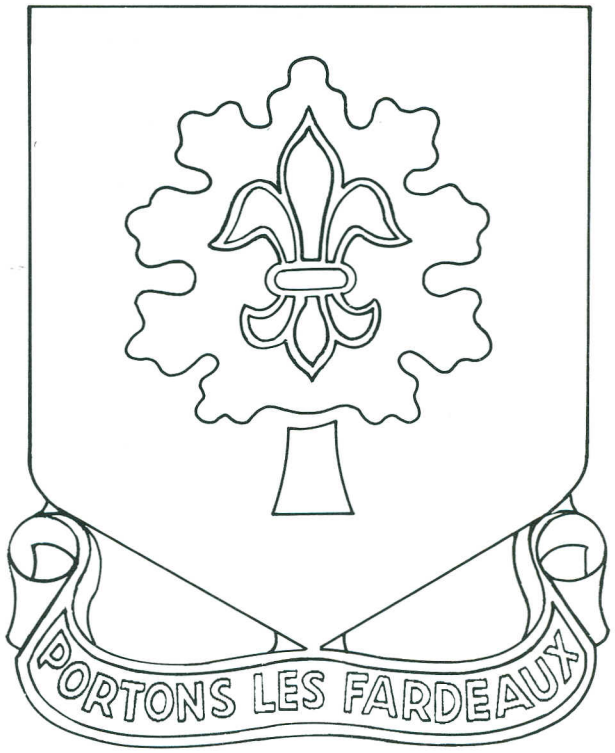
From January 1944 to May 1945, he was Director of the Control Division at Headquarters, 9th Service Command, Fort Douglas, UT. BG Tribe received the Legion of Merit at Fort Douglas and later received an Oak Leaf Cluster to this decoration for service as Chief of the Control Branch, Headquarters, Army Service Forces in the Western Pacific. He was separated from the Army as a Colonel in July 1946. In September 1946, he returned to government service as Assistant Chief of the Management Office of the Department of State. He accepted a commission in the Regular Army and attended the Industrial College of the Armed Forces from September 1947 to June 1948. He was then assigned to the Munitions Board, Office of the Secretary of Defense, and became Assistant to the Director of the Staff of the Munitions Board in June 1949 and Assistant to the Chairman in December 1950. In July 1951, BG Tribe was assigned to Germany at Headquarters, U.S. Army Europe, as Assistant Chief, Supply Branch, Quartermaster Division. He became Area Quartermaster at Headquarters, Area Command, in Heidelberg, Germany, in June 1953.

Returning from Europe in July 1954, BG Tribe was assigned to the Office of the Quartermaster General (OQMG) as Chief, Office of Plans and Programs. He later served as Executive Officer, Deputy for Operations, and as Chief, Office of Procurement and Inspection Policy, both in OQMG. During the last six months of this tour of duty, he was Chief of the Department of the Army Coordination Group for Department of Defense Logistics Systems Study Project. He was awarded an Army Commendation Medal for his service.

In February 1958, BG Tribe returned to Europe as Chief, General Purchasing Division, Headquarters, U.S. Army Communications Zone, in Orleans, France. He received his second Army Commendation Medal for consolidating and reorganizing Army procurement offices in Europe.

In July 1959 he was named Commanding Officer of the U.S. Army Quartermaster Supply Center, U.S. Army in Europe, at Giessen, Germany. There he was responsible for requirements, distribution and procurement of all Quartermaster items of supply used by the Army in Europe. BG Tribe remained at this assignment until his appointment 26 May 1960 as Commanding General, Quartermaster Research and Engineering Command, Natick, MA. From August 1962 until retirement in 1964, BG Tribe was Commanding General, General Supplies, Research and Engineering Laboratories, Natick, MA. He joined the Marriott Corporation in 1964 as Vice President of Purchasing. In 1969, he became Vice President, Legal and Administration, for the National Food Management Company, Washington, D.C. In 1972, he became Vice-President of Procurement for Jerrico Corporation, Lexington, KY, and was elected to its Board of Directors in 1975. He retired to his home state of Utah in 1983.

101st SUPPORT BATTALION



" LET US CARRY THE BURDENS "

LINEAGE

Organized 17 February 1918 in the Regular Army in France, as the Motor Supply Train, 1st Division

Reorganized and redesignated in August 1918 as the 1st Supply Train, an element of the 1st Division

Reorganized and redesignated 23 March 1921 as the 1st Division Train, Quartermaster Corps

Reorganized and redesignated 23 March 1925 as the 1st Division Quartermaster Train

Inactivated 15 June 1931 at Fort Hamilton, New York

Redesignated 1 May 1936 as the 1st Quartermaster Regiment and activated at Fort Hamilton, New York, as an element of the 1st Division

Headquarters and Headquarters Company and Companies A, B, and E reorganized and redesignated 11 October 1939 as the 1st Quartermaster Battalion, an element of the 1st Infantry Division (remainder of regiment disbanded)

1st Quartermaster Battalion (less Ordnance Medium Maintenance Platoon, Headquarters Company) reorganized and redesignated 17 November 1943 as the 1st Quartermaster Company (Ordnance Medium Maintenance Platoon, Headquarters Company, concurrently reorganized and redesignated as the 701st Ordnance Light Maintenance Company – hereafter separate lineage)

1st Quartermaster Company reorganized and redesignated 2 January 1964 as Headquarters and Headquarters Company, 1st Supply and Transport Battalion (organic elements constituted 23 October 1963 and activated 2 January 1964)

Inactivated 15 May 1985 at Fort Riley, Kansas

Reorganized and redesignated 1 May 1987 as the 101st Support Battalion; concurrently activated at Fort Riley, Kansas, as an element of the 1st Infantry Division

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