

USAWC STRATEGY RESEARCH PROJECT

**STRATEGIC IMPLICATIONS OF ELIMINATING THE AMMUNITION OFFICER SPECIALTY
WITHIN THE UNITED STATES ARMY AND A PLAN OF ACTION TO ENSURE SUCCESS**

by

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This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The views expressed in this student academic research paper are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.

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ABSTRACT

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In 2001 the U. S. Army approved a proposal to merge what previously had been two separate Army Ordnance officer specialties into one specialty. This policy change, effective in year 2006, merges the mechanical maintenance (91B) and ammunition officer specialties (91D) into a general ordnance specialty (91A). The overarching rationale for this change was that it was cost inefficient to maintain both the 91B and 91D career tracks and it was exceedingly difficult to maintain a viable professional development regimen for 91D officers.

The 91D professional development regimen was principally affected by the post-1989 draw-down that caused the elimination from the active force structure of most of the ammunition units and junior command and staff positions within the Army. At the same time, assignment and professional development opportunities for 91B officers were not correspondingly impacted. Although the Army eliminated much ammunition force structure, both the Army and the Department of Defense (DoD) retained virtually all of the senior (O-5 and O-6) 91D positions within DoD. In some headquarters, 91D senior officer requirements have increased.

The management of ammunition on the battlefield has historically been an enterprise of strategic importance. The Army's ability to manage this critical commodity at the strategic level has greater importance today given the reliance on precision munitions in current and future campaigns. Until now the Army has been the only Service that trains commissioned officers with specific skill sets and bestows a unique ammunition officer specialty. Unless the Army takes action, an unqualified officer may, in the future, encumber a critical ammunition billet with potentially disastrous strategic implications.

A reasonable solution for the Army is to provide targeted education and training to the new 91A ordnance officer and to consider assigning senior ammunition warrant officers into billets in support of 91A officers encumbering strategic staff positions that require technical ammunition expertise.

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STRATEGIC IMPLICATIONS OF ELIMINATING THE AMMUNITION OFFICER SPECIALTY WITHIN THE UNITED STATES ARMY AND A PLAN OF ACTION TO ENSURE SUCCESS

It is important when you haven't got any ammunition to have a butt on your rifle.

—Winston Churchill (1874 - 1965) English statesman, author¹

A soldier can survive on the battlefield for months without mail, weeks without food, days without water, minutes without air, but not one second without ammunition.

—Old Army Slogan²

Ammunition is a commodity that traditionally has rated very high in importance on the battlefields of old and more recently it has proven crucial on the battlefields of the current day. From the days since the discovery of gunpowder, to the days of the rifled musket, to the days of the machine gun, to the days of submarine-launched cruise missiles, ammunition has played a critical role in the success or failure of military forces. While in the earliest days of the United States Military, the management of ammunition or munitions was considered complex and worthy of specifically assigned personnel to the management enterprise, today, the management of munitions is even more complex given the multiplicity of weapons and corresponding munitions employed by the joint force. In fact, there is a significant dichotomy between what many consider critical or non-critical to the ability of nations to make war in this millennium. While some might argue that the industrial age has passed and that humans today live predominately in an information age, one of cyber space, digital architecture and instant communication; in the pursuit of war, the elements are almost equally matched: information age constructs equally important as industrial age hardware. Certainly until the great scientific minds of the 21st century develop a new method of launching lead or producing percussion effects - methods more sophisticated than those that actuate the bullets, bombs, mines, and other explosive devices of 2004 - there will continue to be a need for ammunition on our battlefields and smart people to manage it.

One might argue that if new weapons systems become available - weapon systems like the phasers and photon torpedoes of science fiction or lasers or other directed energy weapons systems - perhaps ammunition and the weapons that launch same will become obsolete. If lethal or non-lethal effects could be derived from such weapons systems, then nations and other non-state actors might be able to impose their will on others using these alternative systems. This might render the multiplicity of weapons with their corresponding logistics considerations

(ammunition) something akin to how modern formations today consider bows and arrows...relatively useless. As we begin this millennium, however, we're not very close to photon torpedoes and even if we, as humans were, there would still be as there are now, large numbers of guns all over this planet. Rightly or wrongly, the chosen technique for dealing with armed individuals or formations - those who possess those guns - in this century, is with other guns. As long as this remains the case, ammunition and its appropriate management will remain important to those who would pursue their interests by applying force.

This paper proposes that the management of ammunition within the military has historically been an enterprise of strategic importance. Additionally, the U.S. Army's ability to manage this critical commodity at the strategic level is no less important today than previously in history. The Army traditionally has trained and educated commissioned officers to manage ammunition throughout the spectrum of military operations unlike any other Service. Recent force structure and officer management decisions, however, put at risk the Army's ability to effectively manage ammunition within the Army and within the Department of Defense (DoD) as a whole. Unless the Army takes action to rectify current officer training, education and assignment processes, the officers with inappropriate skill sets may be placed in ammunition management positions of critical importance. The decisions they make or fail to make could have strategic consequences.

We will make the case that certain officers within the military must possess a special understanding of ammunition management in order to help make well-informed decisions of strategic consequence. The logic supporting this proposition is derived from five subsets of particular concern. These are; (1) the uniqueness of ammunition – its very character, (2) the criticism of ammunition management, during peacetime and immediately following virtually every conflict within the last 50 years, (3) the recent history of ammunition management constructs and initiatives within the DoD, (4) the role of commissioned officers within the DoD ammunition management structure and an assessment of the knowledge areas they must possess, (5) the past and present processes for assessing and professionally developing the ammunition management officer corps. We will consider the appropriateness of the current professional development architecture for officers charged with ammunition management responsibilities and make recommendations that, if implemented, will mitigate the identified shortfalls in the commissioned ammunition officer training education and assignment processes.

AMMUNITION – A UNIQUE COMMODITY

Ammunition has always been and will continue to be a unique commodity. It is a critical class of supply on the battlefield that must be managed at the tactical, operational and strategic levels of war. The well-known adage that a soldier can last a week without food, a day without water, but not one minute without ammunition has been proven many times over in the history of armed forces both in the United States and around the world. Each Service component of the joint force has ammunition requirements that are essential to support both war and military operations other than war.

DEFINITION

DoD defines ammunition (or munitions) as a complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological, or chemical material for use in military operations, including demolitions. Certain suitably modified munitions can be used for training, ceremonial, or non-operational purposes.³ The nature of ammunition requires very specific considerations as compared to other classes of supply. It is explosive, normally a hazardous material, and highly pilferable. It is therefore subject to specific safety, environmental and security considerations not inherent in other commodities. It is very heavy and may not be compatible with other classes of supply for shipment and storage. In fact many types of ammunition must be separated for storage and shipment to prevent accidental detonation. Finally, ammunition, unlike food, fuel or repair parts does not have a similar civilian sector industrial base supporting production. While a few civil vendors make some small arms that are suitably fired by DoD weapons, larger caliber and unique explosives are not independently available in the private sector. Therefore, detailed planning and long lead times must be considered when programming ammunition procurement.

A HISTORICAL PERSPECTIVE

That munitions are a unique commodity and require specific expertise in order to properly manage is a long-held belief within the military. In 1876, the Chief of Ordnance published a document which was actually book-length defining the history of the Ordnance Department and explaining its *raison d'être* to the Secretary of War and the Army as a whole. In it he proposed that:

“...Dealing with explosive agents of various kinds of which, even at this day, little is known that given certain mixtures, certain results will follow by combustion. ...The study of explosives ... the application of known principles to produce desired results ...requires lifelong study. An accomplished Ordnance officer

should be conversant with all the modern useful arts, and with the scientific principles upon which those arts depend.”⁴

Even though 128 years later, the role of Ordnance soldier as scientist is no longer in vogue, the expertise which he or she must possess to manage this unique battlefield commodity is no less critical than it was in 1876. Interestingly enough, the Chief of Ordnance was fighting a downsizing fight within the War Department (part of the rationale for publishing his report) that is only slightly different than the situation faced today. His thoughts deserve our consideration.

“The next principal question is: What reductions can be made in the number, rank, and pay of the enlisted men and officers of the present Ordnance Department? ... Measured by the actual necessities of the public defense; a just and reasonable economy in the expenditures of public moneys; and the capacity for timely and effective service and increase in time of actual war, the magnitude of the Ordnance service, as a portion of the present military establishment, is not too great.”⁵

His was a battle to retain the size of the Ordnance Department, but he used the unique contribution, the unique expertise of the Ordnance soldier as part of his rationale.

CRITICISMS OF AMMUNITION MANAGEMENT

That the management of munitions is of crucial import to a multiplicity of interests both inside and outside of the federal government should be obvious, but in order to drive this point home we will endeavor to review some of the more noteworthy public criticisms of ammunition management. Thoughtful reflection upon the collective criticism of munitions management over the years also might lead to the discovery of what knowledge areas tend to be critical to those individuals charged with senior-level ammunition management duties.

POST-CONFLICT CRITICISM

While it would be possible to go back at least several centuries to discover criticisms of ammunition management in support of combat operations, for the sake of brevity, we will go back only fifty years to the Korean War. We'll also look at post-Vietnam criticisms, issues related to Operation Desert Shield/Storm, Kosovo, and finally Operation Iraqi Freedom.

Korea

There was an ammunition shortage during the Korean War and the scrutiny that this issue received generated what became known as a “furor”⁶ in Washington, both during and after the war. In fact, so contentious was the issue that a special subcommittee on ammunition shortages was convened by the Senate Committee on the Armed Forces, the predecessor of

today's Senate Armed Services Committee. Over seven hundred pages of testimony were taken over a period of nine days in April of 1953. Multiple senior Army and DoD officials testified before the subcommittee which had been charged by the full Committee to essentially find a "culprit" for the perceived ammunition shortage.

While the Senate subcommittee never did name a guilty culprit in the Korean War ammunition imbroglio, the Army's experience in this war did point out specific areas of concern regarding ammunition management.

1. Inventory issues and the relationship between inventory and defense appropriations. Although there was an extremely large amount of ammunition inventory at the conclusion of World War II (WWII), the Army did not have adequate visibility of all of the stocks. There were many reasons why the ammunition reporting system did not result in an adequate snapshot of the military's ammunition inventory,⁷ but the end result was that in 1950 when war broke out, the Army was ill-prepared to predict the shortages that were about to occur. Additionally, while the Army had significant assets on hand for many rounds, some, especially those not deemed critical to the WWII campaign, were immediately in short supply in 1950. Finally, between the two wars the Bureau of the Budget had a policy that required the Army to "live off its residual war stocks rather than to buy any items which it already had on hand."⁸ This situation caused a depletion of stocks and no industrial base warming during the inter-war years.

2. Production base issues. Related to the inventory issue was the notion of how to compute ammunition that is in the "production pipeline." Ammunition components are typically produced at different locations and then assembled in a single location to produce a complete round. In 1950 there was a great deal of ammunition components in storage that had not been assembled. Were it not for the availability of these components, what little production "surge" that did occur during the Korean War, may not have been possible at all.⁹ The availability of machine tools was a major problem. The ability to rapidly produce new (or even older) types of ammunition is inextricably related to the availability of machine tools. Machine tools (presses, lathes and punches) are large, unique pieces of machinery that take time to make. The machine tool industry had begun spinning up for WWII two years prior to Pearl Harbor. Machine tool assets, therefore, were in place when the war effort called. After WWII the industry constricted and the government was not postured with a ready answer for the production shortfall that needed addressing during the Korean War.¹⁰

3. Requirements generation. Several aspects of requirements generation were problematic in Korea. Whereas today there is a Joint Strategic Capabilities Plan - directed operational plan for many geographic areas of the world including Korea, in 1950, there was no

plan. In fact, prior to the invasion of South Korea in June of 1950, the Joint Chiefs of Staff had informed the president that “Korea had no strategic significance.”¹¹ Additionally, it was especially difficult to determine the requirements to levy upon the Nation’s manufacturing capability once war started given an average 24-month lead time from receipt of a contract for production until an actual round was produced.¹² Finally, the days of supply required for combat in the early 1950s were a very rough guess at best. As we struggle in the current day for an appropriate requirements generation model, it is interesting to recall a thought posited in 1954, that, regarding ammunition, “one must remember that not only is the day of supply an engineering approximation, the possibility of the war plan’s being a correct forecast of unwritten history is very remote.”¹³ And you will recall there was not a “war plan” for Korea.

4. Battlefield ammunition management/leadership. While most of the Korea lessons touched on so far address strategic issues, there were ammo lessons at the muddy boots level as well.

One that particularly resonates is the story of Colonel (COL) John A. Harbart, the most highly decorated field grade officer in Ordnance Corps history. In various high-level duty positions within the IX Corps and Eighth Army, COL Harbart’s advice on the battlefield in Korea in several instances made the difference between victory and defeat in key engagements. Existing ammunition supply on the ground in the Korean War was initially hampered by the lack of a centralized authority. Responsible for ammunition management were the Eighth Army headquarters supply staff (G-4) and ordnance sections and the corresponding general staff and special staff sections of the three corps. The changes in tactical boundaries and command responsibilities for the three corps worked against a rapid response to a fluid and changing situation, especially in the area of ammunition management. Additionally, the Eighth Army staff was too far from the scene of battle to provide consistently adequate supply decisions.

Based on experience in the first year of the war and with the advice of COL Harbart, General Ridgway decided to activate a brigade-level ammunition group to coordinate all ammunition supply in the forward Army area rather than fragmenting it among the four corps (including the Marines). The 314th Ammunition Group was established in the Eighth Army in March 1951 and provided better command and control over ammunition supply than had existed before.¹⁴ It is important to consider the command and control issues as well as the sound advice provided by a senior ordnance officer on the ground when we later look to the more current battlefields of Iraq and Afghanistan. The same lessons were relearned.

5. Experienced ammunition leadership. Finally it is important to note that when the G4 of the Army in 1953, LTG W. B. Palmer testified before the Senate Subcommittee, he went to

great pains to introduce his key ammunition advisors and even went so far as to highlight their military service resumes with particular attention paid to ammunition management experiences.¹⁵ This group consisted of no less than two major generals, three brigadier generals and one COL. It is arguable whether this show of force was very useful in supporting the Army G-4's points or whether these men were particularly smart or innovative fellows. The reality is, however, that they had a great deal of experience in munitions management affairs, their records proved that and they were greatly respected by senior Army and Congressional leadership. Whether a similar group of ammunition-experienced individuals could be assembled today is a question to ponder. This will be addressed in greater detail in the "Ammunition Officer Professional Development Assessment" section, below.

Vietnam

If ammunition was important in Korea, its incredibly high usage factor points to an even greater importance in Vietnam. Several points of comparison highlight this. In WWII, the U.S. industrial base produced 50 times as much artillery and mortar ammunition as that produced in WWI. During the Korean War, ammunition expenditure rates exceeded WWII levels. During the Vietnam War, the tonnage of ammunition shipped to that country exceeded both WWII and the Korean War levels.¹⁶ The Army's experience in this war, just as in Korea, pointed out specific areas of concern regarding ammunition management – some of the lessons learned were the same lessons.

1. The industrial base. The ammunition plants that were owned by the government and operated by contractors (Government Owned – Contractor Operated or GOCOs) proved to be critical to Korean War ammunition production and, as opposed to what happened after WWI and WWII, the ammunition industrial base was not eliminated after Korea. The international political climate after Korea - fear of a great war against the Soviet Union - thankfully prohibited it. Eleven GOCO plants had been maintained on a reduced scale between the two wars and as American involvement in Vietnam increased so did ammunition production and corresponding industrial base requirements. By 1966 seventeen ammunition plants were in operation and by 1968 that number had grown to twenty-five. While significant advancements were made in manufacturing processes, the production base once again fell into disrepair following the Vietnam War due to reduced budgets.¹⁷ A significant management structure had been developed by the military to manage this large industrial capacity. Unfortunately, while the capacity to produce ammunition was extremely robust during the Vietnam War, the inefficiency

of military ammunition production was severely criticized. This criticism, however, in the long run, was fortuitous because it instigated needed change.¹⁸

2. The Single Manager for Conventional Ammunition (SMCA). The United States Code charges the Military Departments to “exercise authority to conduct all affairs of their departments to include recruiting, organizing, supplying, equipping, training, servicing, mobilizing, demobilizing, administering and maintaining forces.” That this is still true today has been reinforced in Joint Pub 4, Doctrine for Logistic Support of Joint Operations.¹⁹ Each of the Services independently procuring ammunition during the Vietnam War, however, highlighted inefficiencies in this process. Consequently, in 1975 under Congressional pressure, the DoD directed the Department of the Army to develop an agency to execute centralized ammunition management responsibility for all of DoD. The SMCA stood up in 1977.²⁰ This organization, which has received a great deal of criticism in the last 27 years, nevertheless, gave the Army and its leaders a significant role in the management of ammunition for the entire military from the post-Vietnam years to the present.

3. Operational lessons. Just as in the Korean War, battlefield lessons regarding ammunition management were significant. The obstacles that the military had to overcome were many in Vietnam and as each of the issues are explored in detail, it becomes apparent that ammunition professionals at all levels from the field force in Vietnam, to the Department of the Army and to the DoD were the reason that adequate ammunition support was eventually achieved throughout the conflict.²¹ First of all there was the issue of ammunition units and expertise in the theater. The arrival and availability of ammunition units was insufficient to meet the buildup of combat forces. It was not until late 1967 that there were an appropriate number of ammunition units in theater. Also there was the issue of reserve versus active units. Even in the 1960s there were only active ammunition units to support peacetime operations. The rest of the units were in the reserves. That those units were never activated for operations in Vietnam and the fact that there were not enough trained active duty ammunition personnel continued to hamper support throughout the war. Finally there was the issue of command and control. Early on it was recognized that the force in Vietnam needed a senior ammunition staff officer (Colonel) and soon it was recognized that an ammunition group command had to be established. Just as in Korea, these organizational changes were eventually made to the betterment of ammunition management overall in the theater.²²

4. Strategic lessons. Just as in Korea there were continued problems with shortages of various types of munitions. Some were due to the fact that the desired munitions were relatively new and the production base could not respond fast enough to increased demand. Other

shortages were due to the difficulty of in-theater distribution. Also funding had to be appropriated above what was in the original budget (remedied by Congressional supplemental action). The funding lag, combined with the fact that ammunition manufacturing requires long lead-time retooling, both contributed to the shortage of desired items in theater. The requirements generation issue was another problematic issue. At the start of the conflict, WWII and Korea supply rates were what was used, and it was only after historical rates had been documented in combat in Vietnam that those rates became appropriately re-adjusted for the modern force fighting in the jungles of Vietnam. Lastly, there was the issue of reporting. The peacetime reporting processes were inadequate for the high intensity consumption and necessary resupply for the forces in Vietnam. The ammunition reporting processes that were in place at the end of the conflict were vastly different than what was in place at the start of the operation.²³

5. Personnel lessons. LTG (Ret) Joe Heiser captured a key lesson from his experience as the commander of the 1st Logistical Command in Vietnam and later as the Army Deputy Chief of Staff for Logistics. His thoughts were:

“The Continental U.S. training base is overly civilianized. The small pool of trained and experienced military people in maintenance operations, ammunition operations, storage and warehousing operations, and supply management is incapable of providing the number of skilled personnel needed when a force buildup starts. Either depots and installation logistics facilities should increase their military strengths or Continental U.S. civilians in these facilities should be used to support an overseas buildup until the Continental Army Command school system can turn out the required number of trained military men and women. An additional benefit that would result from using more military in Continental U.S. logistical installations would be that there would be assignments in Continental U.S. where skilled overseas returnees could employ their expertise.”²⁴

Today as ammunition operations within CONUS are virtually all civilianized, the concern that General Heiser expressed in 1974 is still valid. The very real potential of the U.S. military to have a shortage of skilled munitions professionals in time of war in the future will be explored in greater detail later.

Other Recent Conflicts

The conflicts since Vietnam have continued to highlight the importance of sound ammunition management before, during, and after war. While each conflict highlighted below is very different in scope and scale as compared to Korea and Vietnam, as well as each other, many of the same lessons were revisited.

1. Desert Shield/Desert Storm. This enterprise, interestingly enough, validated many of the lessons learned in previous conflicts; therefore few “new” issues arose during this operation. There were senior ammunition commands deployed and a significant number of ammunition units were deployed to support the combat forces. Reserve and National Guard ammunition units were activated so that by the time ground combat operations had begun there were adequate units in place on the ground. Regarding ammunition availability, there were sufficient war reserve stocks so that there were nearly 45 days of supply on hand in theater prior to the commencement of ground combat operations.²⁵ The short duration of the operation and the huge amount of ammunition that was shipped to theater mitigated any significant requirements discussion following the conflict. Additionally, there were no documented ammunition shortages. It is important to note also that at this time there was a significant active duty ammunition structure both in the tactical field Army and in the CONUS training and industrial base. There were ammunition professionals with a great deal of experience in ammunition operations at all levels of the Army and the DoD. This would not be the case twelve years later when the Nation contemplated going to war in Iraq.

2. Kosovo. This was another relatively short operation, however, its importance to the management of ammunition in the future should not be underestimated. In this operation, precision guided munitions were employed in great numbers for the first time. These munitions, also known as “preferred munitions,” were in high demand, yet difficult to replenish within short timeframes. As the U.S. inventory of cruise missiles became dangerously low, the industrial base could not rapidly replenish this critical munition.²⁶ Simultaneously during this conflict less exotic munitions were in high demand. Flechette hydra rockets were a priority item for task Force Hawk. Although these munitions contained vintage 1960s technology, they were considered a critical item. Small arms ammunition for special operations helicopters was another high-priority item that demanded intensive management. Ammunition professionals from the tactical level to the highest levels within DoD were involved in the logistics of getting these munitions to forces in theater. Finally, the issue of requirements generation came to the fore once again in this operation. How could the military have so grossly underestimated its cruise missile requirement?²⁷ Although the DoD had published its Capabilities-Based Munitions Requirements (CBMR) Directive²⁸ three years before, it was not widely implemented by the Services and did not consequently ensure adequate ammunition requirements had been established for a conflict like Kosovo. Nevertheless, the Directive was an attempt at getting all the Services on the same sheet of music regarding requirements generation. While requirements generation is not necessarily the primary domain of ammunition managers, their

familiarity with the CBMR construct and munitions requirements generation in general continues to be important.

3. Operation Enduring Freedom (OEF) / Operation Iraqi Freedom (OIF). Although these operations are ongoing at this time, they have already rendered numerous lessons learned.

The first area of concern was force flow. For OIF, Ammunition units were not integrated into the deployment sequence appropriately. While there were many reasons for this, the fact of the matter is that munitions units were not on the ground when required. Appropriate transportation units were similarly unavailable. Therefore, munitions distribution suffered.²⁹ The parallels to Vietnam are unmistakable. Another area of concern was accountability and reporting. Units generally did not maintain property book accountability of their munitions as required by policy and therefore, reporting of on-hand assets was notoriously inaccurate. Additionally, although a senior ammunition headquarters was established early on in OIF, the unfamiliarity of the personnel assigned to this reserve unit with standard Army ammunition reporting processes generated a loss of visibility at the theater level of critical ammunition stocks. The active units that were deployed were generally unfamiliar with how to maintain accountable records since the installations from where they deployed have munitions managed by civilians who do not deploy. The active units were not adequately trained.³⁰ Again the lessons from LTG Heiser come to the fore. We're reminded of the importance of keeping critical skills in the active component and training them. Currently there is no active ammunition group headquarters and virtually all CONUS-based ammunition units do not maintain accountability of ammunition at the local installation ammunition supply points.

CRITIQUE OF DOD AMMUNITION MANAGEMENT CONSTRUCTS

The SMCA

Although envisioned to be a bellwether for DoD efficiency regarding ammunition management, a series of reports over the years³¹ have indicated that the SMCA is anything but. Congress and the General Accounting Office (GAO) have periodically reviewed the performance of this enterprise and found it wanting. In 1979, the first review of SMCA operations was conducted by the GAO. It found that the SMCA needed more control and a stronger position within the DoD in order to make it effective. The GAO stated that the organization of the SMCA was actually a hindrance to the centralized management of ammunition.³² In 1982 the GAO conducted a follow-up study and found that while some improvements had been made, the SMCA still had not effectively achieved the goal of centralized ammunition management. It cited wasted resources in multiple areas and generally

called for improvement of the munitions management processes within the DoD.³³ Today the SMCA still exists with modifications made over time in response to deficiency areas. As recently as 11 February 2004, however, it has once again come under fire as not being appropriately responsive to the needs of the Military. On this the Army Chief of Staff indicated that the Army would likely need another small arms ammunition production plant due to the inability of the current SMCA-managed architecture to keep up with demand.³⁴

The Existing Industrial Base – The PNNL Study

In 1997, the Pacific Northwest National Laboratories (PNNL) issued a report requested by the Army regarding the acquisition process and the industrial base.³⁵ The Army requested the PNNL study in response to the National Defense Authorization Act of 1996 where Congress directed the Army to review its conventional ammunition management for DoD. This extremely comprehensive study identified existing shortfalls and made recommendations. The study made three major findings:

- The industrial base is currently adequate for peacetime and wartime needs, but is not efficient;
- Ammunition management is fragmented within the Army; the Army lacks a centralized management approach;
- Funding instability reduces the viability of the industrial base.³⁶

The study made many recommendations for change and as of now only a few of the recommendations have been embraced. One significant recommendation was the establishment of a Program Executive Officer for Ammunition, which in fact has occurred. Perhaps the fundamental finding of the study, however, is the theme that threads through virtually all of the highlighted issues. Specifically, the study recognizes that “ammunition and ammunition production requires special knowledge, skills, and business acumen that set it apart from other commodities.”³⁷ This comment sounds virtually the same as the thought echoed earlier by the Chief of Ordnance in 1876.³⁸ Then as now, this recognition is important for the Nation and for the military. Not only should the country retain these special skills within its borders, but the military must maintain a core capability to manage the effort.

The Army’s Arsenal and Ammunition Plants – The Rand Study

As is obvious by this point, there has been no shortage of internal and external scrutiny of the Army’s ability to manage ammunition. In 2003 the Rand Arroyo Center published the most

recent large-scale study of ammunition management. It did this at the request of the Army with the mission to identify logistics infrastructure the Army could divest of without jeopardizing its ability to accomplish its national security mission.³⁹ The study identified eight related problems with ammunition management.

- The industrial base lacks a strategic vision and plan.
- Army ownership of the industrial base is not a core Army function. Managers' attention tends to be diverted from more essential tasks.
- Reduced workload contributes to high unit costs.
- In government-operated facilities, it is difficult to relate costs to output, and prices are distorted.
- The industrial base has difficulty competing for capital investment funds in the Army budget process.
- Ammunition receives low priority for funding, which has detrimental effects on the industrial base.
- Disposing of excess facilities is a lengthy process.
- Ammunition replenishment policy is in a state of flux.⁴⁰

The Rand study does not offer a solution for all of these problems, but does make recommendations on ownership/management strategies for the Army's plants and arsenals. The strategy includes a mix of privatizing most of the ammunition plants, retaining some as government-owned facilities and creating a federal government corporation for the Army's two arsenals.⁴¹ Some other particularly noteworthy findings came out of the study as well. One, well-known among Ordnance officers, but unknown outside of this community, has to do with the experience base of those charged with managing the Army's ammunition industrial base. Specifically, the study points out that "within the Army logistics community, the deputy chiefs of staff for logistics as well as the commanding generals of the Army Materiel Command and its subordinate Operations Support Command typically have neither served in nor commanded an arsenal or ammunition plant. Normally, even the commanders of the arsenals and plants themselves lack direct experience before assuming command, because the only authorized position in each plant is that of the commander."⁴² The Rand study uses this dynamic as part of its rationale for privatization, however, whether or how much the Army decides to privatize is not the core issue. The Army professional knowledge base is. Expertise in the management of arsenals and plants is a knowledge area that the Army can ill-afford to let atrophy. As the

history presented thus far has shown, the industrial base is no less important today than it was 50 years ago, and our ability to properly leverage it continues to have national security implications.

ROLE OF COMMISSIONED OFFICERS

The preceding chapters demonstrate that munitions management within the DoD and certainly within the Army is a complex and important enterprise of strategic consequence to the United States. At the crux of each historical vignette reviewed here, whether an example of the Army at war or one of the many studies of ammunition management (four studies were specifically cited, but there have been many more), is the importance of people. The contribution of junior military and government and contractor civilians has been addressed. General Heiser addressed the importance of trained military and civilian workforce in Vietnam and today's after-action reviews of Operation Iraqi Freedom echo the same thought. Another more important issue, however, is the criticality of senior ammunition-trained personnel, specifically, the senior military commissioned officers. The role of the senior military commissioned officer is essential to tying together the multiple, disparate threads of fiber – the fiber of ammunition support that weaves through the DoD from the tactical through the operational and finally at the strategic level of war. These senior military officers are the glue that links the multiple spheres of munitions management that must occur at the tactical-operational levels and the strategic/industrial base level.

OTHER SERVICES

While each Service plays a role in supporting its own forces (Title 10 responsibility), the Army has taken the preeminent role in managing ammunition support for the DoD. That is not to diminish the role that senior commissioned officers of the other Services play. Logisticians within each Service must ensure that their formations are suitably armed; however, up until recently the Army has been the only Service with a long tradition of specially training and educating commissioned officers to serve in the role of ammunition manager. The US Navy has always detailed officers from either its supply corps or its explosive ordnance disposal community to ammunition management duties. The Marine Corps most often assigns limited duty officers who previously served as ammunition warrant officers to ammunition management duties. The US Air Force has had a recently tumultuous history regarding its ammunition officer management process. In the early 1990s in an effort to right-size its officer specialties, it eliminated the munitions management career field altogether and combined those personnel coded as munitions officers with aircraft maintenance personnel. In 2001 and 2002, the

combined specialty was split out again in order to maintain and develop ammunition expertise, something that had been degraded during the interim.⁴³ The Army by contrast, has, during the entire period of history reviewed here, maintained a cadre of uniquely trained, educated and specialty-coded ammunition officers. These individuals have traditionally occupied critical positions within the DoD and Army organization for ammunition management.

STRATEGIC BILLETS

In order to understand the importance of the role of senior ammunition managers, one must review where within the DoD these officers serve. While an exhaustive authorization document review is not practical here, a few of the most important organizations should be addressed. As opposed to how the management structure existed during the cold war when the management architecture was much larger with many more officers assigned,⁴⁴ today's structure is much leaner. The critical role of the senior ammunition manager in this leaner force structure, however, is certainly no less important. Particularly crucial organizations are; (1) the Army Materiel Command headquarters, the Army's most senior logistics headquarters, (2) the Joint Munitions Command at Rock Island, Illinois, the agency responsible for executing the Army's SMCA responsibilities, (3) the newly established Program Executive Officer for Ammunition at Picatinny Arsenal, (4) the Army and Joint Staff in the Pentagon, and finally, (5) the senior joint and Army field commands. Virtually all of these organizations have senior ammunition management positions for Lieutenant Colonels (LTCs) or COLs. These individuals are either decision makers or personnel whose advice to senior DoD executive leadership on ammunition matters impacts national security at the highest levels. The question before us is whether or not the personnel the Army assigns to these positions have the necessary background and training to maximize their potential contribution. Are they the right men and women for the job?

AMMUNITION OFFICER PROFESSIONAL DEVELOPMENT ASSESSMENT

Having trained and experienced commissioned officers in key roles within the DoD has been essential to the security of this Nation throughout our history. Having commissioned officers imbued with essential knowledge of supply and logistics, particularly the ammunition management function has been of particular importance. When the Army established the Army Industrial College in 1924, one of its stated purposes was to train officers "in the useful knowledge pertaining to the supervision of all military supplies in time of war and to the assurance of adequate provision for the mobilization of materiel and industrial organizations essential to wartime needs."⁴⁵ At one time Army Ordnance officers were largely responsible for

all weapons and ammunition procurement for the War Department. While this obviously has changed over time, the critical skills of the Ordnance officer, especially with regard to the ammunition area of expertise has remained constant. In fact Constance Green's observations from 1955 are still germane. He was speaking of development of the new combatant arms (field artillery, infantry, cavalry, etc.) that were developed pursuant to the National Defense Act of 1920. These new chiefs were all two-star generals who reported directly to the Army Chief of Staff. They were to cooperate with the supply branches in the development of arms and equipment. Green wrote that the Chief of Ordnance ceased to be the czar whose dictates on military characteristics and design of weapons the using arms accepted without demur...The Ordnance Department became the skilled servant, not the master, of the using arms."⁴⁶

PRINCIPAL KNOWLEDGE AREAS

If senior ammunition officers still play a crucial role within the DoD, what knowledge areas should they be "skilled" in, if in fact, these ordnance officers are to be the "skilled servant"? If the LTCs and the COLs in the five key billet areas noted above are critical to making the correct strategic decisions regarding ammunition, what knowledge areas must they be conversant in? In what areas should they possess expert skills? Determining this was part of the rationale for reviewing the historical vignettes and critical reviews of ammunition management within the Army and the DoD. While it is impossible to enumerate everything the senior ammunition officer needs to know in order to perform affectively, certainly some key areas have been addressed again and again over time. The principal knowledge areas are:

- Requirements generation. Although not necessarily within the strictly defined domain of the logisticians, senior ammunition managers must understand how munitions requirements are generated within DoD – from the tactical level, to establishment of required supply rates at the Corps or Army level, to how munitions requirements are generated as a component of major weapons systems acquisition programs. Equally important as ensuring the warfighter has enough ammunition, is the imperative to ensure that the warfighter does not have too much. The nature of conflict today does not allow for the establishment of iron mountains of supplies.
- Industrial base management. While the industrial base will no doubt permutate in the near term as it has consistently changed since the establishment of the Springfield Armory in 1794, this important area must be understood by senior ammunition managers.

- Munitions and weapon systems acquisition. Senior munitions officers, 91D officers are not acquisition corps officers, however, many are called upon to advise the acquisition community and make recommendations to senior defense officials responsible for making munitions research, development and acquisition decisions. These senior munitions officers must have a general understanding of defense acquisition processes.
- Munitions funding processes. What is required is not only a general knowledge of the planning, programming, budgeting and execution process, but in particular how munitions procurement, maintenance and disposal are funded within DoD.
- Munitions accountability, reporting and asset visibility processes. Knowing what munitions are on the battlefield, what is enroute to the battlefield, what is in the CONUS base and what is in the industrial pipeline have been consistent issues since the Korean War. Senior managers must have knowledge of the multiplicity of management information systems that attempt to facilitate the munitions management process.
- Corps and theater-level ammunition logistics. While a senior ammunition officer may not have had the experience of operating an ASP as a junior officer, it is essential that he or she understand the macro-logistics of ammunition flow on the battlefield and how munitions flow from the CONUS base to an area of operations and eventually to the trigger pullers. Senior munitions officers will be called upon to integrate munitions planning considerations into CONPLANS and OPLANS so this knowledge area becomes essential.
- Joint ammunition logistics. Combatant commanders have directive authority for logistics, yet the typical joint staff is not sufficiently staffed to execute this responsibility for the combatant commander. The senior munitions manager must be knowledgeable not only of his or her own Service's ammunition management processes, but those of the other Services as well.
- Safety, security and environmental consideration. These unique aspects of munitions must be understood in order to enhance force protection of personnel who come into contact with what is essentially a dangerous, pilferable and sometimes environmentally hazardous commodity.

This list while not all inclusive, forms a basis for expansion. It contains the fundamental building blocks of knowledge required by the senior ammunition manager. It spans knowledge

areas from the tactical and operational levels of war to strategic decision making at the highest levels of government. Officers imbued with knowledge and experience in these areas would no doubt be poised to make a significant contribution in any key senior ammunition officer billet.

This review and the recommended knowledge areas for commissioned officer ammunition managers does not diminish the importance of the contributions of senior civilian ammunition managers within the DoD. In fact one of the most senior officials within the DoD, responsible for ammunition programming, is a civilian, Mr. Anthony J. Melita, Deputy Director, Strategic and Tactical Systems, Munitions, OUSD(AT&L).⁴⁷ Certainly civilian personnel will always play a critical role in ammunition management within the DoD. However, in order to understand the full spectrum of ammunition operations, to understand what happens at both the pointed end of the spear and to understand what happens at the industrial base of the spear, a uniformed military perspective is required. For only a uniformed service member can experience the range of operations from the tactical to the strategic level. It is this person, who then is poised to synthesize the experiences and lessons learned in such a way as to be able to make correct decisions about the requirements for ammunition support to our forces or to properly advise other senior defense officials who will make the decisions for arming the forces of the United States.

ARMY CONSOLIDATION RATIONALE

If senior ammunition officers play key roles within the Army and the DoD, and Army officers encumber many key ammunition manager billets within the DoD, one must ask why the Department of the Army recently approved a plan that eliminates the ammunition management officer specialty? The fact is that the Army determined that it was unable to resource a separate functional specialty or area of concentration (AOC) for ammunition officers. Further rationale was that it was no longer able to sustain a viable professional development construct for the ammunition AOC officers, also known as 91Ds (Munitions Materiel Management AOC).⁴⁸ The Army, therefore, has embarked on a consolidation effort by eliminating its unique ammunition officer program and retaining a single "ordnance" officer specialty combining mechanical maintenance, missile/electronics maintenance and ammunition functions. While the Air Force tried a similar construct, then later reversed itself, the Army continues to proceed with the consolidation effort.

One of the primary reasons that the Army had to consolidate the AOC 91D into a new general ordnance officer, or AOC 91A, is the problem with its force structure. When the Army was larger and had multiple ammunition battalions, ammunition plants and other corresponding

support structure it was relatively easy to grow a senior ammunition officer through a series of professionally developmental assignments from the most basic tactical level up through higher headquarters command and staff assignments. After the downsizing of the field force and the attempted right sizing of the industrial base over the last 15 years, a force structure no longer exists that will professionally develop the senior ammunition officer. In fact a recent review of the Personnel Management Authorizations Document showing FY 04 and 05 officer personnel⁴⁹ bears this out and frankly identifies a fundamental problem that absolutely must be addressed. The chart next under identifies the requirements basis for ordnance officers in the total force.

GRADE	90A	91A	91B	91D	91E	Grand Total
O2	5	24	1052	108	5	1194
O3	1206	210	938	260	70	2684
O4	1196	187	254	98	30	1765
O5	851	115	69	51	13	1099
O6	340	29	6	9	4	388
Grand Total	3598	565	2319	526	122	7130

Source: FY04 data extracted from 0306 TAADS

TABLE 1. ORDNANCE OFFICER REQUIREMENTS

The data for FY 05 is similar and clearly shows the challenge. While it has always been relatively easy to professionally develop a 91B (Maintenance Materiel Management AOC) officer given the smooth pyramid of requirements (note the 1052 lieutenant requirements and 6 COL requirements in the FY04 data), problems with developing 91D officers have been greatly exacerbated by the imbalance in force structure requirements. With only 108 lieutenant requirements, it is not only extremely challenging to grow an ammunition lieutenant into one of the 260 captain jobs, but it becomes extremely challenging to find a well qualified 91D O-6 to fill one of the nine COL assignments. Clearly the challenge is to address how to properly groom the officers who will fill the 51 LTC and 9 COL positions within the force structure given the unavailability of junior and mid-level ammunition management positions from which to grow them. Additionally, three other factors contribute to the problem of growing these ammunition officers. First, the force structure for 91D majors is only 56% in the Active Component (AC), while 74% of the lieutenant colonel requirements are in the AC and 78% of the colonel positions are in the AC. Therefore, the Army must proportionally “grow” more 91D officers over time.

This is extremely difficult given the traditionally higher attrition rates of 91Ds vice their 91B contemporaries, the second of the three factors. Lastly, 91D officers in order to remain competitive for command and promotion, tend to seek out duty positions not coded for 91Ds. This tendency, encouraged by Army policy, exacerbates the problem with availability of 91D officers to fill key positions, and further dilutes the ammunition experience base.

OFFICER TRAINING AND EDUCATION

Up until recently the Army and the Air Force (USAF) were the only Services that had specific education and training requirements for specialty-coded ammunition logisticians. The Marine Corps and the Navy normally assign officers to munitions management duties who are supply generalists. The USAF maintains a small cadre of munitions officers; however, it experimented recently with combining several logistics functions into a single logistics management specialty that eliminated the USAF ammunition officer specialty. This four year experiment did not achieve desired results and the USAF is returning to the prior status quo, maintaining a cadre, albeit small, of specifically trained ammunition officers. Effective in 2006, the Army is embarking on its own consolidation effort by eliminating its unique ammunition officer program and retaining a single "ordnance" officer specialty combining mechanical maintenance, missile/electronics maintenance and ammunition functions. The results of this decision are yet to be seen, but in any case the Army maintains a much greater number of officer personnel with specific education training and repetitive assignments in ammunition management positions, far greater than the other Services combined. This fact combined with the Army's specific SMCA experience makes the Army officer particularly valuable in a joint ammunition planning and execution environment. Additionally the ammunition warrant officer corps provides unique technical knowledge and experience that many commissioned officers lack. Army ammunition warrant officers are particularly well versed in the many nuances of ammunition management within the DoD.

A DILEMMA AND A SOLUTION

The elimination of the ammunition officer specialty within the Army with senior ammunition officer positions continuing to exist into the foreseeable future poses a dilemma for the Army. This dilemma may be reasonably solved by a multi-faceted strategy. The strategy should include a combination of institutional education, distance-learning, force structure, and personnel management changes.

Institutional Education / Distance Learning

Currently all ordnance officers receive a modest amount of ammunition training in the officer basic course and the combined logistics officer advanced course. This is the last formalized ammunition education that is part of the Army Officer Education System. Given the force structure dilemma noted above, many officers without any ammunition assignment history may be placed in a mid or even a senior level ammunition management position.

In order to set this officer up for success, a reasonable solution would be to provide training for all ordnance officers when they attend the Army Command and General Staff College (CGSC). This now universal institutional learning experience would provide all ordnance officers with some fundamental munitions management tools should they later be assigned to senior ammunition management duties. A basis for a program of instruction for these officers could be the eight knowledge areas suggested above which have been proven over time to be essential to those personnel making decisions regarding ammunition management.

For personnel not attending the Army CGSC, including those attending other Military Education Level-4 producing schools, as well as government civilian personnel, a distance learning/web-based product should be developed in order to provide the necessary training.

Personnel Management Considerations

Once the Army combines the 91B and 91D AOCs, it will be difficult to determine which officers might have appropriate ammunition background and experience. Additionally, certain senior ammunition manager positions will continue to require fill by officers with a greater level of ammunition knowledge and training than others. An additional skill identifier (ASI) should be developed for officers with a greater degree of munitions management experience. Criteria would have to be developed for award of the ASI, but potential prerequisites might include completing two separate ammunition-specific assignments (these would be defined by Training and Doctrine Command/Human Resources Command (HRC)) and completing the CGSC munitions education program. At the same time, key positions within the joint force structure should be coded for fill by these specially experienced officers. Not having the ASI would not exclude an officer from filling one of these specially coded billets (8th Army Ammunition Officer, Joint Staff J4 Munitions officer, for example), but an officer with this ASI would be preferred over one without the ASI. While these personnel management changes require a greater level of detailed management at the HRC-level, they will be necessary to properly administer a smaller, more agile workforce.

Force Structure

Even with the CGSC education program and the ASI concept, certain senior munitions officer billets are too critical to be filled only with a commissioned officer, especially in light of the fast approaching elimination of the 91D specialty. Certain positions require in-depth munitions management knowledge that was previously readily resident in the 91D commissioned officer, but now beginning in FY06, the 91A officer occupying the same position will likely not have the full gamut of ammunition training and experience to be able to properly execute his or her munitions management responsibilities. It is these billets which should be expanded to include both a senior commissioned officer and a senior warrant officer in the grade of CW4 or CW5. As opposed to the 91D of the current force and the 91A of the future force, Army ammunition warrant officers are imbued with tactical and operational ammunition experiences from an early time in their careers. This, repetitive and continuous ammunition assignment experience, the commissioned officer in most cases, will not have. Further, the warrant officer possesses the technical knowledge of ammunition characteristics and componentry as well as the corresponding automated management information systems that many that are sometimes needed at the strategic level for ammunition management decision making. Although a bill payer would have to be identified, the addition of this technical know-how in select senior level ammunition decision making billets would be worth the price.

CONCLUSION

Over the last 50 years Ammunition funding within the Services has been a bill payer for other programs. Funding, however, has actually remained unusually flat in the last several years. Two notable exceptions to this have been funding for joint direct attack munitions and laser-guided bombs. Both of these saw significant use in Kosovo, Afghanistan and Iraq and consequently additional infusions of funding in these programs have been approved by Congress.⁵⁰ Times are changing, however, for ammunition programs overall. Both the 04 and 05 budgets include significant increases in ammunition funding lines. These are just a few indicators that ammunition will continue to play an important role within the DoD into the foreseeable future as it has in the past and the wise management of these resources will continue to be of strategic importance.

A historical review of the Army's experience with ammunition management over the last 50 years reveals key knowledge areas with which senior Army commissioned officers must be expert. The Army's ability to manage ammunition within the DoD may be adversely impacted

unless the Army continues to train and educate it's officers to be able to manage this unique commodity at senior levels within the DOD.

The Army should provide targeted education and training to its ordnance officers at CGSC, it should implement an ASI program for its specially trained ammunition ordnance officers and finally, it should approve senior ammunition warrant officers to be assigned with a senior ordnance officer in key senior ammunition management billets. In this way the Army will be able to effect appropriate decisions regarding ammunition management now and into the future. The right person will be in the right place to influence strategic decision making.

WORD COUNT= 9,181

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