Program Manager for Ammunition
Marine Corps Systems Command

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*Ammunition Quarterly*

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## From the Program Manager

*Mr. Jerry Mazza*
*Program Manager for Ammunition*

Welcome to the winter edition of OUR Ammunition Quarterly. While preparing for this publication, I noted that we are now in our eighth year of publishing this newsletter. It was also apparent that much like our world environment, our ammunition community continues to transform. We are becoming more adaptive to information and technologies, both from the commodity perspective and our "Ammo Information Technologies" that we all rely upon to make sound management decisions for the ammo community, and our leadership. This is clearly evidenced by articles in this edition detailing the Phase II rollout of the Ammunition "Knowledge Management Portal" (KMP) with a new look, enhanced user manipulation, and improved search capabilities. You will see the initial stages of "decision support" tools that will establish a firm umbilical of knowledge between my office and the Marine Forces. You will know what we know and with that, continuity in information will greatly enhance how we support our forces with conventional ammunition. I strongly encourage both your access and use of the KMP and solicit any input and recommendations that would further accommodate our information sharing. Complimenting this is the recent chartering of the "Ammunition Logistics Focus Team (ALFT)" consisting of subject matter experts from various organizations that will concentrate on five core pillars ammunition logistics. It is not sufficient that we do things right, if it is not the right thing to do. This partnering effort will take a very close look our logistics procedures in concert with the Marine Corps strategic vision with the goal of enhancing ammunition logistics. This I believe is long overdue and I am extremely enthused and confident in the team. The article by Ms. Ross and Mr. Banks, "…the Winds of Change.." is a must read for our Occupational Field.

On related, but separate initiative my staff has recently embarked on an effort to baseline our current Class V(W) Total Munitions Requirement (TMR) in various, notional configurations (i.e., MEU, MPF Load, Combat Requirement) with respect movement of assets. Our goal in the future is to assess "footprint reduction" as a result of the pending introduction of new assets in the inventory (Multi-Option Fuze for Artillery, the Modular Artillery Charge System, more lethal M795 155mm HE projectile, etc.) that may all serve to reduce the logistical footprint in the future. We want to be able to quantify such variances in lift requirements for both our internal use and Higher Headquarter strategic planning. This effort will be ongoing for sometime as munitions items are phased in and out of our inventory. More to come on this effort.

Lethargy can be costly. Lethargy in Explosives Safety can cost lives. I invite you to read the update on our efforts with enhancing formal training and certification of our USMC Explosives Safety Officers.

Finally, both Captain Liller and Mr. Payne have provided valuable information on the Linear Demolition Charge program and specifically, the new M1134A4 fuzing. I believe we have come a long way in the safety and reliability of this mine clearing system.

My appreciation to the authors and I sincerely hope you find this edition useful and informative.

*Semper Fi,*

Jerry

# PM AMMO Releases KMP Phase II

*Mr. Dale Franks MCP, MOUS*

During the current FY the PM AMMO web development team rolled out a new version of the Knowledge Management Portal (KMP). Please take note of the new URL:

https://ammokmp.marcorsyscom.usmc.mil

The KMP is a portal accessible through the PMAM website that provides access to a vast range of ammunition-related data, and which can, on approval, be accessed by those with a need to know. With such useful information available at the click of a button, many people are interested in being granted access to it. Fortunately, the approval process is fairly simple, and can be done right over the web. An approval request form can be found at the following URL:

http://www.marcorsyscom.usmc.mil/ammoaccreq.nsf/Request+Form?OpenForm

Simply fill out the form and submit it, and your approval can be granted in a fairly short time.

This new version of the KMP, released on September 10, 2002, incorporates several new features and gives access to new sources of information. Along with these new features, many improvements have been made to the KMP's existing features that increase their usefulness as well.

One of the improvements made to the KMP has been a complete revision of the site's look and feel. The design of the site has been altered, with some images being removed to make downloading faster. In addition, an entirely new navigation structure has been implemented. This navigation structure uses drop-down menus to group the web site's features alphabetically.

A key advantage of this feature is that it allows users to access the information they want while reducing the number of pages through which they must navigate. "This new version is cleaner, easier to navigate, and downloads faster", says KMP programmer Michael Rodriguez.. "That makes it a lot easier to use."

In addition, small "thumbnail" pictures have replaced the large pictures from the Field Inspection CD. This speeds up the download times for the pages. Yet, users can still access the large pictures by clicking on the thumbnails.

Another improvement is the method used to search for information. The current version of the KMP only allows users to search for a particular DODIC. The Phase II version adds to this functionality by allowing users to search for an item by using all or part of an NSN, by all or part of the item's Nomenclature, or by Model Number as well as Condition Code, Activity or partial Activity, or by AAC.

Extra features have also been added to inventory pages for the DODICs. Users can now drill down from the inventory page to see additional information, such as the activity levels for a specific condition code.

This new version of the KMP will be easier to use, and will provide a much greater range of Ammunition-related data. Also, by centralizing this data into a single, worldwide point of access, the KMP will ensure that current, reliable information will be available to anyone in the ammunition community, anywhere in the world, at any time.

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# USMC Explosives Safety Officer (ESO) Training / Certification

***Mr. George Morrison, MARCORSYSCOM-PMAM-EES***

Approximately 2 years ago MARCORSYSCOM-Program Manager for Ammunition (PMAM), as the designated manager of the Marine Corps Explosives Safety Program, conducted research and determined the need for establishing formal training and certification requirements for Marine Corps ESO's.

To date, a great deal of progress has been made toward the goal of formally training and certifying all Marine Corps ESO's, both military and civilian.

Our initial effort was to identify the general areas of expertise required by ESO's to conduct and Explosives Safety Program. The general areas of regulatory requirements, sources of information, explosives safety site planning and Quantity-Distance (QD) computation, storage, transportation, electrical safety, lightning protection, ammunition operations, security/accountability, and risk assessment came to mind immediately.

The next step was to identify what existing training was available in these general areas that would be relevant to the Marine Corps Explosives Safety Program and the ESO. Fortunately, there were several existing stand-alone courses that were suitable for direct incorporation into our training program. This training materials research also lead to identification of more specific areas of explosives safety expertise which could be included in the general training areas.

After selecting the best available existing courses, it was necessary to find a method to validate this training against "real world" requirements. The Navy's Explosives Safety Inspection (ESI) program proved to be one of the best yardsticks to make this judgment. The basic question we sought to address was, "How well does the training material relate, explain, or guide the user in relation to the specific ESI program areas?"

In making the comparison it became evident that there were still specific areas not covered by the existing training courses. A determination was made to develop a course tailored to cover these specific areas. We solicited the expertise of the Army's Defense Ammunition Center (DAC) to assist in building a two-week class of instruction to cover these Marine specific topics. This initial effort was presented to all Marine ESO's at a MARCORSYSCOM funded 80 hour training session held at MCB Quantico.

Subsequent to this initial offering, the class was critiqued and evaluated by the ESO's, DAC, and MARCORSYSCOM. It was determined that, although useful, major content changes were necessary. The Navy Ordnance Safety and Security (NOSSA) organization also expressed interest in adapting the class for use by Navy ESO's. DAC agreed to undertake a rewrite with input from both Navy and Marine Corps explosives safety managers. This rewritten class is organized to mirror the Navy ESI outline. It is currently at the 70% development stage and should be completed by June 03.

After assembling the requirements, materials, and process; the training and certification program was formalized and implemented via MCO P8020.10A.
Once implemented, a survey of all Marine Corps ESO's was conducted to determine individual training status and shortfalls relative to the program requirements. Predictably, the results of the survey covered the spectrum from the fully certified to those with significant training requirements.

From this survey data, individual ESO training files were established at MARCORSYSCOM-PMAM-EES. This will facilitate tracking individual training requirements, refresher-training requirements, forecasting future training quotas, and provide the means to keep individual ESO's apprised of their specific training requirements. One third of Marine Corps ESO's have met all the certification requirements of MCO P8020.10A, and the majority of those not yet certified are within 2 courses of certification. **O**

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# The Winds of Change… Ammunition Logistics Focus Team (ALFT)

***Ms. Karen Ross and Mr. Steve Banks, MARCORSYSCOM-PMAM-IM, and CACI Federal Systems***

After arriving in the objective area, the Unified Commander directs the commander of the Expeditionary Strike Group (ESG) to send the Landing Force ashore to seize and secure an inland airfield and the adjacent port for subsequent operations. Status reporting begins with tactical units using small hand-held devices to report their supply and personnel situation, place orders for additional materiel, and provide the commander with their exact location and situation report. The information reported is delivered by satellite to a central server, and is available to the commander's laptop computer through a web browser. The commander is then able to make informed operational and logistics decisions, based on data that is only minutes old.

Sound like magic? Like Buck Rogers stuff? Perhaps. However, the need is real, and immediate. What we presently give the commander and action officers are mountains of raw data, and only a limited set of tools to enable him or her to extract relevant information. The extraction process consumes valuable time and energy that could be better devoted to exercising the operational functions of command. As the Marine Corps undergoes its early 21st century transformations in logistics and operational concepts, the underlying processes must evolve to provide near real-time awareness of the tactical, operational, and logistics situation to enable mission accomplishment. The ongoing evolution of Expeditionary Maneuver Warfare (EMW), and the supporting doctrine for Ship-to-Objective-Maneuver (STOM) and Sea Based Logistics (SBL) will create the need for significant improvements in information handling and processing, or the complexities of these concepts will overwhelm our tactical and operational commanders. Fortunately, the technologies to make this opening scenario possible are appearing now. We must now ensure logistics time logistical situational awareness.

In 2000, the Joint Chiefs of Staff (JCS) published "*Joint Vision 2020*", a far-sighted document that illustrated where and how the JCS wanted the Services to evolve to meet the needs of the war fighters of the early 21st century. It is a technology-centric vision, one that addresses logistics in terms of information rather than mass, responsiveness rather than redundancy. In response, the Unified Commanders produced a document that detailed what they wanted in a Global Combat Support System (GCSS). This document, known as the "CINC-129 Requirements" articulates the general and specific characteristics they want in their logistics systems to execute the tasks assigned to them by the National Command Authority (NCA). But, how do you go about identifying, developing, and deploying the tools requested by those commanders?

The Marine Forces Pacific Experimentation Center (MEC) is an organization that the Office of the Program Manager for Ammunition (PMAM) has partnered with to gain exposure and buy in from operating forces on new logistics issues. The concept of experimentation somewhat contrasts with the previous conventional development cycle, refining a concept over a period of years before it is operationally tested and evaluated, the MEC is designed to introduce new technologies and concepts to the operating forces as early in the development cycle as possible which is complimentary to the recently revised developmental cycle. In this fashion, promising technologies and concepts can be quickly evaluated for their effectiveness and suitability, and needful changes made early on, when it is less costly and complex to implement them. It is under this precept that the MEC, in partnership with the PMAM, has agreed to establish an Ammunition Logistics Focus Team (ALFT).

The purpose of the ALFT is to examine doctrine, policy, procedures, and techniques, in combination with emergent technologies, and to devise, recommend, and promote changes in those areas through experimentation and analysis. The mechanisms for identifying and promoting appropriate changes is through the use of Universal Need Statements (UNS), Mission Need Statements (MNS), Operational Requirements Document (ORD), Required Operational Capability (ROC), and other lesser-used articles. These "statements of need" collectively serve as a structured forum for identifying to the supporting establishment organizations that are equipped and charged with providing the requested capability that the operating

forces need/want.

The ALFT will initially be composed of members from MARFORPAC, the operating forces, the Marine Ammunition Schoolhouse, and PM-Ammo, with support as required from the MEC, MCWL, Training & Education Command (TECOM), and DCMC I&L, and others as required for accomplishing the tasks at hand. This group will be charged with formulating the general goals and tasks to be accomplished in the subsequent 12-18months.

The ALFT will concentrate its efforts around five pillars, or core principles: Doctrine and Policy; Tactics, Techniques, and Procedures (TTP); Information Technology (IT) enablers; Communications; and, Education. Each of these pillars is directly related to our ability to improve the fundamental logistics procedures we employ to sustain the combatant forces. When developments under one pillar are combined with one or more of the others, it can create a synergistic effect where the total enhancement that is realized by the operating forces may be greater than the sum of its parts.

The ALFT will periodically meet to refine the initial task list, review its progress to date, and determine any future actions required. Depending on the need, these future actions might take the form of requesting insertion of an experiment into a planned exercise, drafting a proposed policy or doctrinal change, or preparing, in concert with the operating forces, a new or updated source document such as an UNS, or MNS. When not actively assembled, the ALFT will continue to collectively work issues through collaborative forums such as PM-Ammo's Knowledge Management Portal (KMP), the Ammunition Quarterly, and other media, as appropriate. The KMP will also serve the community-at-large by providing a ready source of continuing military education on new logistics doctrine, policy, and technologies of interest to the ammunition community in the years ahead.

What should we expect from the ALFT? Having a formally chartered group is one thing, but producing tangible and identifiable results is quite another. A couple of early possibilities suggest themselves almost immediately. The coming transition from the MAARS-II Inventory Control Point (ICP) system to the Navy's Conventional Ammunition Integrated Management System-Open System Environment (CAIMS-OSE) early in FY04 will mostly likely necessitate changes. These could include changes in procedures and transaction-level processes that may be inconsistent with current policy and procedures. The ALFT can examine those necessary changes and draft amending policies and procedures to assist the operating forces and the supporting establishment with making the transition as painless as possible.

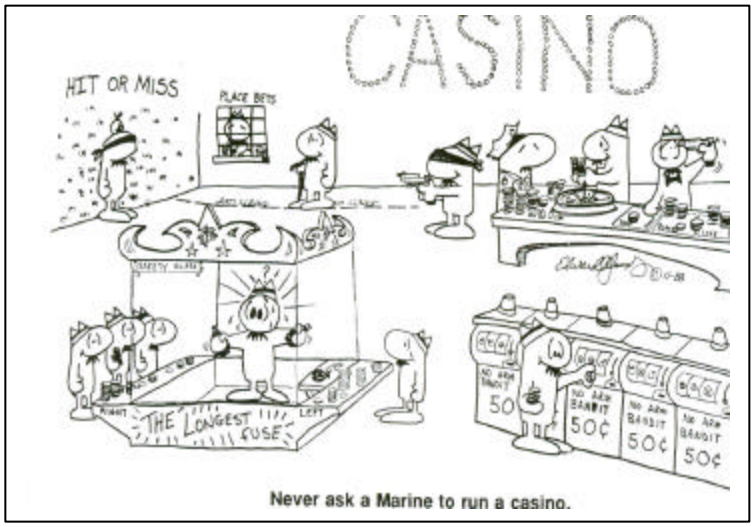
Another area where the ALFT could have an immediate impact is in devising methods to inject the Unit Level Ammunition Status (ULAS) technology into upcoming exercises, separately, or as a "sensor" feeding the Common Logistics Command and Control System ($CLC^2S$). For those unfamiliar with the ULAS, it was designed as a small unit reporting capability for ammunition, combining the technologies of portable electronic devices, satellite-based communications with Iridium modems, a centralized database, and a web server to provide the commander with situational awareness of ammunition, and to generate a range of reports from the aggregated ammunition data, to include the Marine Component Commander's portion of the Joint Munitions Status report, or MUREP. The ULAS was evaluated during a proof-of-concept demonstration during CAX 10-02, and subsequently during a Limited Technical Assessment (LTA) requested by MARFORPAC, and conducted during CAX 1-03. Both tests were extremely promising and indicated the technology has a great deal of potential. While designed around ammunition to maintain a commodity-based focus, the uses of the technology are not restricted to just ammunition, or even to commodities. Results and associated information regarding the ULAS project will soon be available on PM-Ammo's KMP site.

This discussion of a near-term future is intended to provoke thought and initiate the debate about how to meet these various logistics challenges created by operational and tactical change. The challenge before us awaits not just solutions, but the intellectual and institutional rigor to make those solutions and ideas a part of the everyday toolset. It is interesting to reflect that some 30 years have elapsed since the last lunar landing; between the first lunar landing and the end of World War II, it was only 24 years. Yet, logistically, the ammunition business has changed little over that period. It is still approached all too often as a function of "gross tonnage wins". The Persian Gulf War was an aberration, but served to illustrate elements of future warfare and logistics support concepts that are now

coming into the operating forces as doctrine. From the Direct Support Group (DSG) that was created on the fly, we now have the Marine Logistics Command (MLC) construct, and the Integrated Logistics Capability (ILC) that is being examined within II MEF. From the use of MPF withhold shipping as floating supply depots we see the seeds of the beginning concepts for SBL.

As the Corps evolves from its amphibious roots into the ESG of the future, gross tonnage is no longer the right answer, nor is it affordable. The force has grown substantially smaller than it was 12 years ago and the available lift has also been reduced, while transportation and fuel costs have increased markedly. Change is necessary, even inevitable. When managed, in close coordination with the operators, change can produce combat multipliers that enable the force on the ground to move with unprecedented speed and agility, and strike with unimaginable power and precision. The combat force will itself become the sensor and the logistics force the receptor, responding to the combatant's inputs with coherent, focused support that sustains the force. The ALFT is intended to serve as the focus for these transformational efforts as they apply to ammunition logistics. Like our sail-bound predecessors, the Marine Corps ammunition community must adapt to these new conditions, set its sails and tack into the wind.

*Ms. Ross is currently assigned to MARCORSYSCOM-PMAM-IM and may be reached at DSN 378-3119. Mr. Banks is employed by CACI Federal Systems and may be reached at (703) 679-3288.*




Never ask a Marine to run a casino.

*Reprinted with permission of Retired GySgt. Ed Temple,*
`http://members.aol.com/eatemple"`

# THE M1134A4 LINE CHARGE FUZE

***Mr. Robert Payne, ASG Manager, Code 4033, Crane IN.***

Several years ago, the Program Manager for Ammunition decided all of the problems experienced with the fuze for the linear demolition charge had to stop!! Malfunctions such as premature detonations and duds had occurred for years.

This resulted in the Marines in the field having very little confidence in the capability of the system. The Marine Corps Ammunition Branch, Code 4033, located at the Naval Surface Warfare Center, (NSWC) Crane Indiana was contacted and tasked to solve the problem.

The Engineers in Code 4033 contacted the Marine Corps Liaison at the Crane Army Ammunition Activity. They recruited several of Crane Army's Engineers and developed a team to come up with a prototype fuze for the Line Charge. What seemed to be a simple task turned out to be a demanding effort. The new fuze had to meet many safety requirements that its predecessor had not been required to meet. The fuze had to meet the Electrostatic Discharge (ESD) requirements, had to pass Hazards Of Electromagnetic Radiation To Ordnance (HERO) testing, and had to meet the new Insensitive Munitions (IM) requirements. Several years and funding documents later, via much trial and error, the M1134A4 Fuze was born and assigned DODIC ML82.

An effort such as designing a safer and more reliable fuze for the family of Line Charges in the Marine Corps inventory (as well as those under production) was a massive undertaking. It took thousands of work hours, both in and out of the laboratory, and was very expensive. It involved dozens of Department of Defense and Private Sector Agencies. It then had to pass the rigorous scrutiny of the DoN's Weapons System Explosives Safety Review Board, also known as

the "WSESRB". This article is an attempt to share a general overview of what the Marine Corps and its supporting activities experienced in preparing the M1134A4 fuze for fielding.

After months were spent brainstorming and analyzing to come up with a design for a new fuze that would outperform its predecessor, the Team had to present its proposal to the Program Manager for Ammunition, as well as other representatives from Marine Corps System Command. A picture of the proposed fuze was not all that was required - detailed images of the parts, pieces, and the complete item had to be provided; research had to be conducted to identify manufacturers capable of producing the parts; Requests For Proposal (RFPs) had to be submitted to the vendors and time allowed for them to submit their proposals; a Plan Of Action and Milestones (POA&M) had to be developed. Then, and only then, was it time to make the presentation.

After the presentation was made and the many questions answered, the decision was made to continue with the project. The next step was to buy enough parts to assemble test units, both to prove the functionality of the item and to complete the rigorous safety testing required for WSESRB and IM certifications. Another extremely important issue to address was that of finding a facility that could assemble all of the parts and test the units.

Further research found that the Missile Fuze Engineering and Maintenance Branch, also located at NSWC Crane, had that capability. The facility was hired by the Marine Corps Ammunition Branch to build Low Rate Initial Production (LRIP) units for testing before full up production would be authorized.

The ML82 has over 40 parts, all of which had to be purchased, screened, and approved. The first groups of fuzes were built but problems were discovered with components, delaying production. After failure analysis and a Fault Tree Analysis were conducted on the fuze, the Team was able to identify and alleviate the problems experienced in initial testing.

The fuze was retested and not only passed the tests in the Laboratory, but units were sent to Camp Pendleton, connected to Line Charges, and fired in a field environment as well.

Most don't realize the rigorous testing associated with safety and IM certifications. The fuze is dropped from 150 feet, and horizontally, vertically, and forward-dropped from 40 feet. It must go through Transportation Vibration, Jolt and Jumble, Shipboard Shock, Salt/Fog, Sand/Dust, Slow Cook-off and Fast Cook-off testing. On top of all of that, it is put in a chamber for 28 days for the Temperature and Humidity test. During this test, the fuze is exposed to temperatures ranging from 165 degrees to a minus 65 degrees. After it has gone through all of these tests, it then must function properly.

The fuze was also subjected to tests for ESD and HERO certification. When an item is ESD tested, it can be tested at two levels. It is exposed to voltage at the 25,000 and 300,000-volt level. Once the voltage is applied to the item and it does not function, it passes the test. When the M1134A4 fuze was tested at 300,000 volts, it was done so in the "Armed" position, yet still did not function. The fuze has actually been tested at the 130,000 levels and then immediately armed and fired. The most voltage a fuze will encounter under normal conditions is 10,000 to 15,000 volts.

The ML82 fuze is basically a more modern version of the M1134A3 Fuze and functions similarly. The sequence begins on the M1134A4 fuze when the line charge rocket reaches its apex and creates tension on the arresting cable which pulls back the Arming Pin. The Arming Pin serves two purposes. In the locked position it keeps the rotor from rotating and lining up the detonators, and it also contacts the Micro-Switches, preventing energy from traveling to the Wiring Board. Once the Arming Pin has been retracted, the rotor is free to rotate and the Micro-Switch has an open circuit. When the user provides energy, it travels to a Wiring Board and is transferred to the Bellows Actuator. The Bellows ignites and pushes the rotor in a counter-clockwise

*Continued on page 8*

*"Fuze"….continued from page 7*

direction to align the detonators. One second after rotation, the Wiring Board releases more energy, which sets off the detonators that are attached to the linear demolition charge. The line charge is composed of 1,750 pounds of C-4, and clears a path approximately 350 feet long and 50 feet wide.

The M1134A4 fuze is currently being installed in the new M913 and ML25 line charges being produced by the Army Ammunition Plant in Milan, Tennessee. **O**

*Mr. Payne is currently assigned as ASG Manager, Code 4033, Crane Army Ammunition Activity, DSN 482-1804.*

# Linear Demolition Charges; Why CC: N?

***Captain Anthony Liller, APM Demolitions and Linear Demolition Charges, MARCORSYSCOM-PMAM***

So, what is wrong with the Linear Demolition Charge? As the former Ammunition Maintenance Officer and now the Assistant Program Manager for Demolitions and Linear Demolition Charges (LDC), I know one thing to be true; LDCs with the old M1134A1E1/A2/A3 fuze can detonate prematurely, which is a hazard to Marines.

Notice of Ammunition Reclassifications (NAR's) 0184-03 and 0185-03 place all M913 and ML25 LDC's **without** the new M1134A4 fuze into condition code N (emergency combat use only). Ammunition Information Notice (AIN) 007-03 was released and provides details why the decision was made to place these LDC's into condition code N.

History has shown LDC's with the M1134A1E1/A2/A3 fuze are susceptible to premature detonation by static electricity. The Program Manager for Ammunition (PMAM) has worked with industry and government contractors to develop a new fuze that eliminates the possibility of premature detonation. The new M1134A4 (Department of Defense Identification Code (DODIC) ML82) has passed all tests and is now being installed in the new M913 and ML25 LDC's being produced. PMAM understands that placing these assets into condition code N will affect training. However, by the end of February 2003, PM-AMMO will have LDCs with the new M1134A4 fuze at all CONUS training Ammunition Supply Points (ASPs). PMAM also recognizes forward deployed forces may have training opportunities with LDCs that do not have the new fuze. AIN 007-03 authorizes forward deployed units to train with LDCs with the M1134A1E1/A2/A3 fuze if a training opportunity arises. Due to the possibility of premature detonations with the M1134A1E1/A2/A3 fuze and the availability of the new M1134A4 fuze for training, PMAM has decided to place all LDCs with the M1134A1E1/A2/A3 fuzes into CC: N.

The majorities of the M913 and ML25 stockpile, which have the new M1134A4 fuze, are reserved for contingency purposes and are prepped and ready to ship. PMAM has a contract in place to procure fuzes to cover current production as well as additional fuzes, which will cover a portion of the M913 and ML25 stockpile that still have the older M1134A1E1/A2/A3 fuze.

Even with upgrades and revisions, LDC technology is at least 50-years-old. PM-AMMO, with advocates from the engineer community, is trying to make the system safer and more reliable. Last year, PM-AMMO conducted Insensitive Munitions (IM) testing on both M913 and ML25. Both failed the bullet impact, fragment impact, and sympathetic detonation tests. Phase two of the IM test has begun. PM-AMMO is looking at replacement explosives and components that are less sensitive and more IM compliant. An IM compliant LDC becomes important with the development of the Assault Breacher Vehicle (ABV). The ABV, a mine-clearing vehicle, consists of a tank chassis with a line-clearing plow that carries two M913s fired from the top of the vehicle. Test of the ABV is being conducted in February 2003.

PMAM is working an initiative to address the current mine clearing system in its entirety. There have been many upgrades to components of the line charge system, but we have not done a good job evaluating the system as a whole. PMAM is teaming with technical engineers from Code 409 (Fallbrook, CA.) and Code 4033 (Crane IN), who have over 100 years of combined experience with LDCs to adopt new technology to manufacture an improved, more reliable system. Placing LDCs without the M1134A4 fuze in condition code N is the right thing to do and hopefully it will be transparent to the Marines in the field. **O**