Exciting New "Tools" Available for Tankers, Infantrymen and Combat Engineers

Breaching Fortified Positions and Obstacles

by Major Roger Morin and Ty Cobb

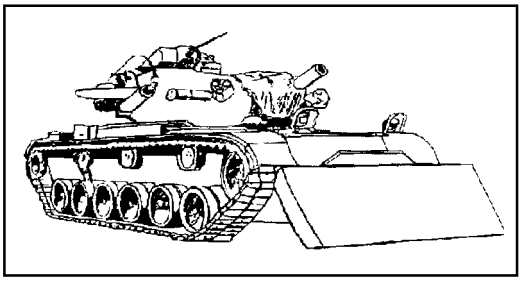
In November 1997, troops of the Iron Brigade (1st Brigade, 2ID) in Korea were the first to fire the XM908 120mm cartridge, the Army's newest tank round. This High Explosive, Obstacle Reducing-Tracer (HE-OR-T) round was fielded, via an urgent requirement, to U.S. Army Abrams tank units in the Republic of Korea (ROK). This "urgent requirement" from the field resulted from the Army's decision in 1996 to retire the venerable Combat Engineer Vehicle (CEV), a modified M60 tank.

Special Obstacle Problem in Korea

While there are areas of the Korean Peninsula that are flat and open, especially in the rice farming areas, much of the terrain is extremely rugged with many narrow defiles and passes. In the early 1970s, while laying out the defense of their nation, the ingenious South Koreans began building "dragon's teeth" or simply, "rock drops." Essentially, where "routes south" pinched into defiles or passes, they "pinched" them even tighter and placed huge reinforced concrete blocks (cubes and pyramids) just above the roads through the passes. Though found primarily in rural areas, dragon's teeth can also be seen in urban areas where bridges, tunnels and overpasses tend to canalize movement. In the event of hostilities, explosive charges would drop these rocks into place as the last friendly units withdrew through them. (The most common "teeth" are as large as 85 cubic feet and weigh upwards of 6 tons.) This action would effectively block, if covered by fires, the "routes south." Such obstacles are also known to exist in North Korea, whose terrain is even more rugged than that of the South.

Rock-drop obstacle in Korea

So, why an obstacle-reducing tank round? If the North Koreans were successful in pushing ROK and UN forces south of the DMZ, there would come a time (hopefully sooner than later) that these forces would want to push the invading force north to the DMZ. Now the dragon's teeth that were not removed by the invading force are obstacles to friendly forces moving north.



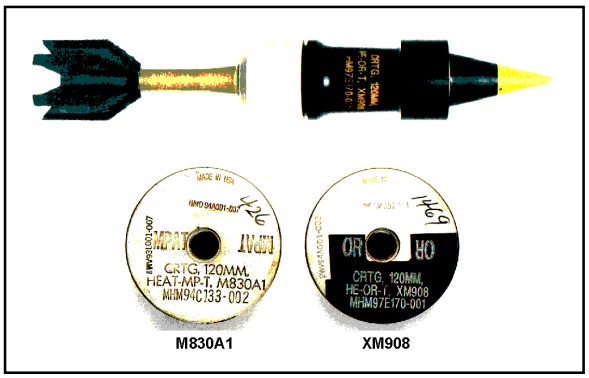
CEVs in Korea: Retirement Bound

Prior to the summer of 1998, the CEV mounting a 165mm anti-obstacle gun with an effective range of 1000m would have been used to rubble these obstacles and others as well. The gun fired a 32 pound HEP (High Explosive Plastic) round that rubbles obstacles by overpowering explosive shock. During the summer of 1998, U.S. Forces in the ROK retired their CEVs, and an urgent call went out for an alternate solution to rubbling by tank-mechanized teams.

The engineers at Picatinny Arsenal test fired every possible tank round, from high velocity Kinetic Energy (KE) to anti-tank shaped charged rounds, for their ability to rubble dragon's teeth. Some of these rounds were quickly assembled prototypes conceived by ARDEC[1] engineers. One of these concepts became the XM908.

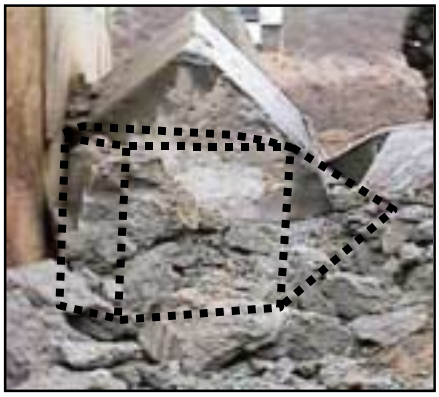
The XM908 is essentially a modified M830A1 Multi-Purpose Anti-Tank (MPAT) round that carries a 2.2 pound high explosive shaped charge. The MPAT's highly sensitive nose switch, a part of the fuzing system, was replaced with a simple steel nose that delays detonation. The steel nose's hardness and the projectile's high velocity (1408 meters per second at the muzzle) allow the round to "burrow" into the obstacle. The few inches of burrowing and delay cause the XM908 to detonate the shaped charge inside the obstacle instead of on the surface for increased effectiveness.

The XM908 is easily distinguishable from the MPAT. The XM908's steel nose has been painted yellow, and "XM908" is inscribed in the metal itself. The cartridge's base end has been stenciled with XM908 markings. It uses the same ballistic (fire control) solution as the M830A1 MPAT round.



M830A1 **XM908**

XM908, and comparison of MPAT and XM908 case bases



Before and after pictures of the XM908's rubbling effectiveness in Korea, Nov '97

Operational Employment of the XM908

The XM908 is only a tool, but a new one whose obstacle-breaching capability should be examined by platoon, team, and task force officers and NCOs. The 2nd Infantry Division's Iron Brigade leads the effort to fully exploit the XM908's operational capabilities. They developed battle drills and refined tactics, techniques and procedures (TTPs) to breach the dragon's teeth. Their TTPs employed basic breaching tactics, but they found that the XM908's capability allowed for a quick breach while enhancing survivability due to the ability to rubble the obstacles from stand-off by a well protected Abrams.

The Iron Brigade's live-fire training against simulated dragon's teeth obstacles proved the round's devastating effectiveness. The accuracy of the tank main gun easily placed a round in the middle of a block from several hundred meters away, and the rubbling capacity of the round rubbled an entire block. Rounds were fired at each block in a defile, and the obstacle was systematically reduced. A few chunks of rubble were as wide as two feet, but most were 3 to 6 inches in size. Because resultant rubble will pile-up in front of the blocks, the Iron Brigade learned that tank units involved in anti-dragon's teeth missions should plan on firing two rounds per block.

A typical tactical scenario might be: Smoke and artillery fire "isolate" the obstacle; tanks rubble the dragon's teeth; tanks travel over the rubble while still using smoke and/or artillery fires to protect their advance; other maneuver units cross the rubble under armor as possible; if the follow-on combat vehicles cannot cross the rubble, the combat engineer's Armored Combat Excavator (ACE) or a tank with a dozer blade can be used to clear enough rubble to permit passage. The rubble would have to be cleared for wheeled vehicle traffic. The keys to success are planning and full team training prior to hostilities. As with any military operation, analysis of situations and training for such situations speeds operations and minimizes casualties.

New Tools for Infantrymen and Combat Engineers

Okay — so the XM908 is a breaching tool for the tankers. What new tools are available for the Infantry and Engineers?"

The Bunker Defeat Munition (BDM) was recently fielded to fill a long-standing void in the assault "tool kit" of infantrymen and combat engineers. The BDM or XM141[2] is an 83mm "disposable" munition designed primarily to defeat threat field bunkers (3 feet of tamped earth around 6" x 6" timbers). ARDEC design engineers developed the BDM around the Marine Corps' Shoulder-launched, Multi-purpose Assault Weapon (SMAW). Based on a FORSCOM urgent requirement supported by TRADOC's Infantry and Engineer Schools, ARDEC engineers designed the BDM to be lightweight and disposable, thus one has the SMAW-Disposable or SMAW-D. The munition weighs 15.7 pounds, has an effective range of 15 to 500 meters, and mounts a variety of night sights. (In contrast, the Marines' SMAW with a round loaded and ready to fire weighs 29 pounds and requires a dedicated gunner.) Operationally, the BDM is a "take me along, if you need me" weapon system, so any unit could use it, though most of its use will be by infantry and combat engineer units.

Firing the new Bunker Defeat Munition

The Bunker Defeat Munition is highly effective against threat bunkers due to its sensitive fuzing and its warhead's 2.4 pounds of high explosive. The BDM is also highly effective against triple brick and concrete block walls, as well as light armor up to and including the BMP2. The Bunker Defeat Munition gets its versatile effectiveness due to its sensitive fuzing which "senses" warhead relative deceleration. Slow deceleration in "soft" targets (such as tamped earth) results in delayed detonation of the explosive causing threat bunkers to be blown up from the inside. Rapid deceleration against hard targets (armor and concrete block) results in super-quick detonation and a strong surface punch.

BDM effects on a bunker

Another new device, the M150 Penetration Augmented Munition (PAM), developed under the direction of the Office of the Project Manager for Mines, Countermines, and Demolitions, was built in response to a Special Operations Forces' (SOF) requirement to defeat heavy reinforced concrete structures. One PAM reduces the loading-bearing capability of the PAM target by 75%. The PAM target is a concrete structure that measures 5 feet wide by 6 feet deep by 15 feet tall with 1-3/8 inch diameter rebar spaced 5.5 inches apart. Weighing only 35 lbs, one soldier can hand-emplace the munition in two minutes. Each PAM replaces 225 lbs of high explosive in destructive force. It was Type Classified Standard for Army SOF Use Only in June 1998. (If engineer commanders need this type of munition, they should identify their requirements to the engineer school, who could then work with DCSOPS to obtain the needed PAMs.)

The PAM is a technical "masterpiece." It contains three separate, precisely-timed warheads. The forward warhead is an Explosively Formed Penetrator (EFP), an ARDEC innovation, and cuts any existing near-surface rebar. The second warhead is also an EFP that "drills" a hole one-meter deep into the target. The third warhead is the Follow Through Charge carrying 5 lbs of explosive. It enters the target and does massive damage upon detonation.

The PAM uses breakthrough technology that should lead to follow-on development of other multi-warhead munitions for a wide range of applications. PAM can be scaled into larger or smaller munitions with further development.

MOUT Operations

"Could these tools be used in urban environments — where future warfare will likely be commonplace?"

After witnessing the overwhelming destructive capability that was brought to bear against the Iraqis during Operation Desert Storm, few military forces will opt to face allied coalition forces. Due to the incredible pace of urbanization of the world's population, the days of the "urban guerrilla" are upon us. As in the jungles of Vietnam or the rugged mountains of Afghanistan, the guerrilla can gain a degree of equality with traditional modern forces. Close terrain is the guerrilla's domain. Urban areas are the "jungles" of the future.

Actually, Military Operations in Urban Terrain (MOUT) present a far worse scenario for military operations than those presented by jungles or mountains. Urban areas present political, cultural, humanitarian and other phenomena that must be considered when planning and conducting MOUT. Witness the WWII orders not to destroy the historic monastery at Monte Cassino during operations in Italy. Eventually, those orders were reversed, but how many lives were lost while obeying those orders? Witness the difficulties encountered in Somalia, Northern Ireland, and Panama.

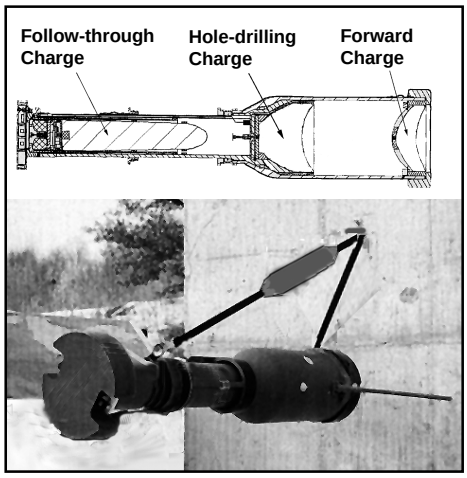
The XM908, BDM and PAM are three new tools that should aid in the conduct of MOUT. Leaders must carefully analyze these tools, then adjust MOUT tactics and techniques for their employment. Orders may restrict rubbling or use of certain munitions or weapons, or permit their use in narrow or broad applications.

Urban warfare demands accurate intelligence and, most of all, intense, prehostility training and teamwork. It is hoped that the result will be more rapid success and reduced casualties.

Notes

[1]ARDEC is a major element of the U.S. Army Tank-automotive and Armaments Command and normally referred to as "TACOM-ARDEC"; herein shortened to "ARDEC."

[2]The "XM" versus the "M" designation for both the XM908 and the XM141 is due to DA's decision to produce only a limited number of rounds.



An M150 PAM charge set in place

Effects of the BDM against concrete block wall (left), and BMP armored personnel carrier (right)

MAJ Roger Morin is the Assistant Project Manager for Tank and Medium Caliber Armament Systems (PM-TMAS) located at Picatinny Arsenal, N.J. He is an Acquisition Corps officer responsible for developing, testing, and fielding tank and medium caliber ammunition, and is the fielding officer for the XM908 to Korea. He is a graduate of the U.S. Military Academy, the Engineer Basic and Advanced Courses, and holds a masters degree in Environmental Health Engineering from the University of Texas.

Tyrus R. Cobb Jr. graduated from the U.S. Military Academy in 1962 with a BS in engineering. An infantry officer, he served as a platoon leader, company commander, and battalion operations officer; as operations officer, 197th Infantry Brigade; as an instructor at USMA; as a battalion advisor to Vietnamese paratroopers in 1968; and as the chief of Requirements Analysis Division of TACOM-ARDEC's predecessor, ARRADCOM. Since retiring from the Army, he's been a civilian with ARDEC, currently serving as Chief of TACOM-ARDEC's Requirements Analysis and Concept Definition Team. He holds an MA in geography/earth sciences from the University of Texas at Austin and an MBA from Florida Institute of Technology.