Alternatives to Antipersonnel Mines

By Captain Bryan Green

On 16 May 1996, the President announced a new policy that establishes guidelines for the use of antipersonnel (AP) land mines by U.S. forces. (See "Clear the Way," inside the front cover.) The following information describes actions taken by the U.S. Army Engineer School in a vanguard effort to prepare for the 1999 moratorium on mine warfare.

Countermobility Mission Needs

For military forces to meet combat mission requirements and stay within the policy limits, they will require nonlethal AP munitions that support the countermobility mission. These munitions must fulfill the intent of AP obstacles against both combatants and nonbelligerents, provide less-than-lethal effects, and preserve the lives of innocent parties.

Munitions that can discriminate between noncombatants and belligerents, such as claymore mines and other man-in-the-loop (command-detonated) systems, are not considered AP mines under the new policy. However, they are discussed as an AP mine alternative in this article.



Photo courtesy Sandia National Laboratories

Sticky Foam

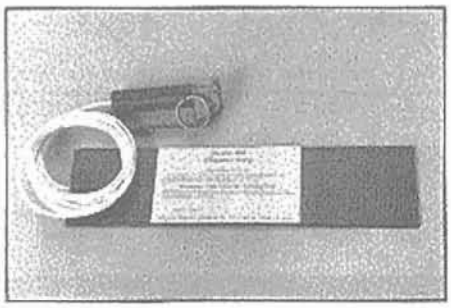
Constraints

When implemented as prescribed, nonlethal munitions must incapacitate, distract, or contain both nonbelligerents and military forces. While directly affecting personnel and vehicles, they must provide the equivalent physical and psychological deterrents as existing lethal mines but leave no permanent damage or intentional disability. Nonlethal AP munitions also must interface with existing military vehicles and systems, operate in all types of weather, and be environmentally safe.

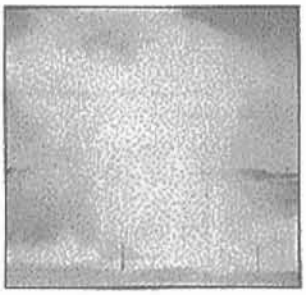
Before describing new technologies that may replace conventional AP mines, we must define what these AP mines do. Review of mine-warfare doctrine and conventional uses leads to four basic capabilities:

- Protect other mines (antitank) or obstacles from dismounted forces.
- Provide an economy of force by effectively denying terrain; they

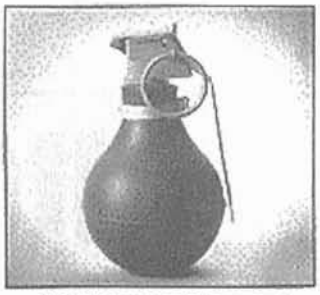
Flash/Bang-Type Munitions



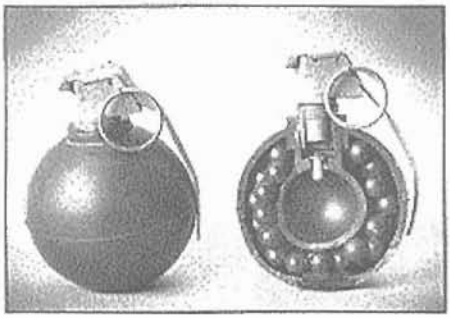
M460 Thunderstrip Stun Munition



Bursting Smoke Grenade



M359 Bursting Obscurant Smoke Grenade



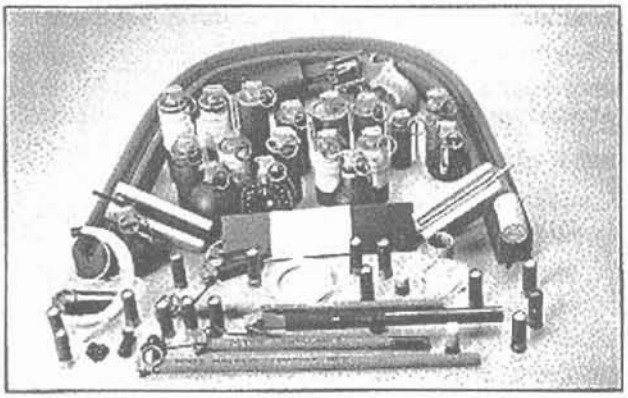
M452 Slingball Stun Grenade



Multiflash Diversion/Distraction Grenades



Rubber Bullet "Slingshot" Ammunition



SPLLAT Munitions

Soft-Projectile Munitions

Various nonlethal antipersonnel munitions that may be used

equate to an additional soldier or sentry on the battlefield.

- Act as a protective obstacle to defeat the enemy's final assault on a position.
- Act as a psychological deterrent.

Any successful AP mine replacement or group of replacements must achieve these four functions. All man-in-the-loop munitions meet these criteria. Command-detonated claymores, for example, allow soldiers to discriminate targets and distinguish between belligerents and noncombatants before detonation. However, many nonlethal options fail to meet the psychological deterrent criteria.

Alternatives

Based on these guidelines, the Army and the Engineer Corps are pursuing alternative nonlethal man-in-the-loop and tunable (selective-energy/progressive-penalty) munitions.

The countermobility remote-control system (CIRCE) is one man-in-the-loop initiative. It is a teleoperated system of fiber-optic monitors that relays information back to the controller. It allows the operator to decide whether to fire or not. The CIRCE controls conventional mines and effectively makes them command-detonated.

Possible alternative nonlethal munitions

System	Capability
Tasar	Shoots low-voltage darts that incapacitate the target.
Sticky-foam mine	Covers the target with encapsulating foam.
Sting net	Shoots nets that are charged with low-voltage electricity and cover a 50-meter area.
Microwave energy	Beams from a field generator and slowly heats the skin. It gets hotter as the target approaches the source. If the target progresses too far, the heat produces a casualty.
Soft-projectile kinetic-energy munition (Nonlethal claymore mine)	Shoots rubber balls, beanbags, or baton rounds instead of steel pellets.
Water slug munition (tunable munition)	Fires supercharged slugs of water in the autonomous mode or turns to an explosive charge when command-detonated.
Texas boot	Locks or attaches to the foot, immobilizing or limiting mobility.
Embrittling/galvanizing agent (a spray chemical or powder)	Corrodes material or fibers or causes mechanical parts to fuse together.
Radio-frequency-kill munition	Causes a nonnuclear electromagnetic pulse that destroys computers and electronic circuits, effectively stopping vehicles and forcing equipment to be operated manually.
Tessler coil	Creates a harmonic wave that produces a tremor within a 100-meter radius.

Another man-in-the-loop system is the intelligent minefield (IMF). This prototype system will ultimately develop into both an artificial intelligence and a man-in-the-loop automated combat-security outpost. The outpost will employ an array of lethal, nonlethal, and tunable munitions. The IMF probably will control a suite of sensors that can cue fires and command and control elements.

Tunable munitions are systems that incorporate nonlethal technology. Selective-energy munitions remain autonomous while in the nonlethal mode, preventing casualties or damage to noncombatants. They can be placed in a lethal mode when there is a man in the loop.

Progressive-penalty munitions provide another option. They are designed to temporarily incapacitate both soldiers and noncombatants. These tunable munitions start with a nonlethal response but progress to an ultimately fatal penalty for continued perseverance in a particular direction.

Some nonlethal systems that the Engineer School is considering for future use are shown in the table above. These are just a few of the alternatives currently being pursued.

We welcome new ideas for AP mine replacements. To offer suggestions, call Captain Bryan Green at the Maneuver Support Battle Lab, DSN 676-7355 or commercial (573) 563-0131, extension 3-7355.



40-millimeter baton/beanbag/sponge round

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