

LETTERS

Dear **ARMOR**,

So what's the big "game change" of the advanced multipurpose (AMP) round? ("XM1069 Advanced Multipurpose Munition Concept Is a 'Game Changer'" by Steven A. Peralta and Jeffrey McNaboe, **ARMOR**, April-June 2013 edition) Is it an improved capability or simply a reduced "battlecarry"?

The authors suggest that the XM1069 AMP round replaces the M1028 canister and M830 high-explosive (HE) anti-tank (AT) (HEAT), M830A1 multipurpose HEAT (MPAT) and M908 obstacle-reduction rounds. Well, yes, I suppose it might replace them, but only if you give up having their specific capabilities. Also, there's some double- and triple-counting here. For example, the M830A1 was supposed to replace the M830, not be carried alongside it. The M908 is essentially a modified M830 with the point fuse removed to allow deeper obstacle penetration. So are we really replacing it, or just losing that capability, too?

Meanwhile, the Armor Branch is ignoring the already long-available solution. Please join me down memory lane.

Canister is in effect a "shot-gun" round for cannon. One can debate its merits on the modern battlefield, but to suggest that it is not effective against AT guided missile crews at long range is

ludicrous, since it was never intended for that. However, beginning in the 1960s, the M60A1 fired the 105mm "Beehive," which was a canister round (loaded with nail-like darts rather than balls) with a manually set timefuse. Given the range, the loader set the nose knob before shoving it in the chamber, and the round detonated in front of the target out to 4,400 meters. The Beehive could well address a long-range target in the open, and linking today's digital fire control with an automatically set range fuse would be at least as simple as the proposed AMP round's unspecified (and then a miracle occurs?) "datalink."

HEAT is first and foremost intended to penetrate heavy armor with all its metallurgical and technological wizardry and add-ons (rolled homogenous plate, face-hardened, spaced, laminated, angled, reactive applique, etc.). Developed in World War II, it was a replacement for the then-limited capability of the armor-piercing (AP), solid-shot, kinetic-energy round. HEAT was the best-penetrating tank round until the AP discarding sabot of the 105mm main battle tank, the M60. Because of its limited but still effective blast in conjunction with its relatively high velocity, and thus accuracy, HEAT was retained as a general-purpose round.

MPAT, on the other hand, is already a compromise

round. With claimed improved blast effect over HEAT but far less filler volume than conventional HE, it was developed when M1A1 tankers pointed out that they had only two types of service rounds, the sabot and HEAT, both optimized for AT use. Similarly, there was a rush for the poorly-thought-through M1028 canister round. At the time, HE was not desired because its different ballistic characteristics complicated the existing fire-control computer.

So why don't tanks fire HE? Let's go back to World War II and the 75mm M4 Sherman.

The M4 tank fired essentially the same relatively low-velocity round with the same point-detonating impact fuse as the 75mm field-artillery cannon, little changed since the World War I-era "French '75." It was a good general-purpose round against soft targets, but increased enemy tank armor caught the armor force unprepared, and better AT capability was desperately needed. Before rounds like HEAT and sabot could be developed and fielded, the answer was higher velocity for existing AP. The M4 (76mm) was soon fielded. Though its barrel diameter was negligibly larger, it had a much larger cartridge with 2.5 times the powder charge. With similar projectiles at higher velocity, the 76mm would penetrate about one

inch more armor than the 75mm gun at comparable ranges.

Even this improved level of penetration was soon found inadequate, but in the meantime, the higher velocity and flatter trajectory rendered the HE round far less effective since much of its already limited burst was directed into the ground and wasted. Recall also that the field artillery had early on recognized the limitations of 75mm ammunition and replaced the 75mm gun with the 105mm howitzer.

What did the armor force do? The interim answer was to husband the 76mm tank for AT use and rely on the 75mm tank against soft targets, while M4 (105mm) howitzer tanks were added into the tank battalion headquarters and headquarters company as a three-tank "assault gun" platoon. With victory and the introduction of 90mm M26 Pershing tank, and its subsequent Cold War variants – the M46, M47 and M48 Patton series – the problem sort of went away, though it not adequately resolved.

Meanwhile the British developed an HE squash head. It was a soft plastic-explosive filler with a base-detonating fuse. Upon impact, the warhead would literally flatten against the hard surface and then detonate. This tremendously focused the round's

explosive energy. Even when the round failed to fully blast through, it caused the other side to spall. Developed as a bunker-busting round, the spall effect also occurred against even heavy armor. At least it did so as long as the armor was solid and not with spaced cavities, but those modifications came later.

The United States fielded the round under the designation *high-explosive plastic* (HEP). In the M60 series' 105mm tank gun – with its low velocity and hence soft recoil, a large explosive charge and a very simple and reliable unexposed fuse – HEP was deemed effective against troops, fortifications, materiel and, to a limited extent, even stationary tanks. It was the general-purpose round of the 105mm M60 Patton series. While its low velocity supposedly reduced accuracy, the actual problem was the limited accuracy of the hand-cranked optical coincidence rangefinder and cam-operated mechanical ballistic computer, which was then cutting-edge technology. With the laser rangefinder of the M60A3, not to mention today's digital fire control of the Abrams, a 120mm HEP would be fantastically accurate and lethal.

So pardon me for being underwhelmed by the proposal

to someday field yet another compromise round with goodness knows what sort of sophisticated multi-option fusing mechanism, not to mention the "datalink," that must be retrofitted into the tank. Personally, I'd suggest fielding the 120mm HEP round to give tomorrow's tanker the same capability that yesterday's tanker had. Meanwhile, please consider that this is all just a repackaging of the original MPAT and its obstacle-reduction variant, which together I thought had already "revolutionized land warfare as we know it." It seems to me that you could have simply replaced the M830A1 point fuse (or reinserted it into the M908) and had something a while ago.

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ACRONYM QUICK-SCAN

AMP – advanced multipurpose
AP – armor-piercing
AT – anti-tank
HEAT – high-explosive anti-tank
HE – high explosive
HEP – high-explosive plastic
MPAT – multipurpose (high-explosive) anti-tank