

OPINION

NATO's 5.56 mm standard rifle and light machine gun cartridge is under fire, following extensive combat experience in Afghanistan. Despite being of American origin, it has always been a controversial choice in the US due to its small size and lack of power.

Now, a catalogue of complaints is building up from other users, notably British soldiers. These focus mainly on its poor long-range effectiveness, erratic lethality even at short range, a lack of suppressive effect and poor barrier penetration. The commander of German troops in Afghanistan has also complained about its lack of stopping ability and penetration.

What exactly are the problems with this cartridge, which was selected by NATO in 1980 to supplement the existing 7.62 mm round? The issue generating most complaints from the British Army is the lack of effective range. When the 5.56 mm cartridge was adopted, combat experience in previous wars had established that 90 per cent of all small-arms actions took place within 300 m.

Falling short

This is not the case in Afghanistan, where more than half of Taliban small-arms attacks on British patrols take place between 300 and 900 m, with rifles and light machine guns (LMGs) using the powerful old Russian 7.62 mm rimmed cartridge, equivalent to NATO's 7.62 mm.

This places a much higher premium on long-range performance than anyone expected.

Not surprisingly, the 5.56 mm quite literally falls short. First, it slows down more rapidly than the much heavier 7.62 mm NATO bullet, so the bullet's energy falls from 50 per cent of the 7.62 mm's at short range to 30 per cent at 1,000 m.

Secondly, it is more subject to wind drift, making it more difficult to hit targets at longer ranges. Finally, when it does hit, it is much less effective. The British L85A2 rifle has been found to be of little use beyond 300 m; the long barrel and higher velocity of the L86A2 Light Support Weapon extends this to perhaps 400 m, while the third gun normally carried by foot patrols, the short-barrelled L110 Minimi LMG (valued for its high volume of fire at short range), is regarded as a 200 m weapon. All of these are in 5.56 mm calibre.

Another problem is terminal effectiveness. Military ammunition cannot legally take advantage of expanding bullets used commercially for hunting, which can inflict devastating injuries. So military bullets, especially the small 5.56 mm, rely on a 'yawing effect' to maximise their effectiveness.

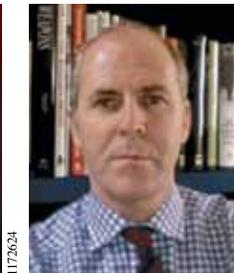
'Yawing' describes what happens when a pointed bullet enters a dense medium like a human body: it will usually become unstable (turning sideways) before travelling base-first through the target.

This 'bullet upset' greatly magnifies the size of a wound, making it more likely that the target

Time to bite the bullet over under-fire ammo

The time has come to acknowledge the significant limitations of 5.56 mm ammunition in British and NATO service and consider alternative solutions,

write Anthony G Williams & Nicholas Drummond



will be rapidly incapacitated. However, the effect is unreliable.

If a 5.56 mm bullet yaws rapidly after impact it can inflict severe wounds; but if it fails to yaw before the bullet exits the body, the resulting small hole may only have a limited effect unless a vital organ is hit. Some soldiers have likened it to shooting needles.

Several 5.56 mm hits may then be necessary to neutralise an enemy; there have even been cases where enemy combatants have got back up after being shot several times. In these circumstances, the bigger the bullet, the better.

British soldiers who have combat experience of both 7.62 mm and 5.56 mm rifles are in no doubt that the 7.62 mm is far more reliably effective. US Army troops are in an even worse position since their standard rifle is now the 5.56 mm M4 Carbine, which has a short barrel that reduces bullet velocity and energy.

The third problem with 5.56 mm ammunition is its lack of suppressive effect; the ability to pin down an enemy until heavier fire support can be brought to bear.

Both experimental testing and practical combat experience have revealed that the small noise made by a supersonic 5.56 mm bul-

let passing by is much less effective than that from 7.62 mm.

Barrier penetration is another problem. The standard 5.56 mm bullet is not bad at penetrating thin armour because it has a hardened steel tip, but it has little momentum and so finds it much more difficult to plough through car doors and windscreens, mud walls or timber. Even when it does penetrate, it usually has little remaining energy. It is also more easily deflected by obstacles such as vegetation on its way to the target.

Taking action

What all of this boils down to is that the 5.56 mm cartridge is simply not big and powerful enough to fulfil the role thrust upon it of being the standard rifle and light machine gun round.

It is bad for morale when troops are unable to respond effectively with their rifles on half the occasions when they come under fire and bad for the budget when they have to resort to firing very effective but very expensive Javelin anti-tank guided missiles instead.

What can be done to solve these problems? Actions can be divided into three stages; immediate, medium term and long term. The British Army is already providing an immediate response by redeploying 7.62 mm L96 sniper rifles (made surplus by the arrival of the L115 .338 rifles) and 7.62 mm L7 General Purpose Machine Guns (GPMGs) down to section level, carried by foot patrols. This is good, but not ideal; the manually-loaded L96 is slow-firing, the GPMG very heavy. The Ministry of Defence has therefore instituted two medium-term programmes, one to produce a lightened version of the GPMG, the other to buy a quantity of a different, even lighter, 7.62 mm LMG, comparable with the Russian PKM used by the Taliban.

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While this is the best that can be done for now, it does not provide a complete answer. It still leaves the majority of weapons at section level in 5.56 mm calibre, with the disadvantages remaining.

New developments

Some may argue that a wholesale return to the old 7.62 mm calibre would solve the problems, but that would bring disadvantages of its own. The ammunition is twice the weight of 5.56 mm and the recoil is much more severe, making rifles uncontrollable in automatic fire. The recoil also makes it more difficult to train recruits to shoot accurately.

A long-term solution may emerge from programmes in the UK, US and other NATO countries to develop the next generation of small arms. At present, it is assumed that the rifles and LMGs will probably retain the existing 5.56 mm ammunition alongside 7.62 mm weapons. However, this process provides a once-in-a-generation opportunity to rethink the whole question of the appropriate calibre of small arms ammunition.

What would be ideal would be a round that offered a longer effective range, more reliable terminal effectiveness, superior barrier penetration and better suppression than the 5.56 mm, without incurring the heavy weight and recoil of 7.62 mm. There is clear evidence that this could be achieved.

Before the American 7.62 mm cartridge was adopted as the first NATO standard rifle and machine gun round in the early 1950s, there was considerable disagreement over the calibre. The British, Belgians and Canadians argued strongly for a 7 mm cartridge, which was significantly smaller and developed much less recoil than the 7.62 mm, but had a long bullet, giving it excellent long-range performance.

The British government even formally adopted this ammunition along with the compact EM-2 rifle. However, this was abandoned in the face of American pressure. It is now obvious that the British were right, and that the 7 mm would have been a far better rifle and

machine gun cartridge than anything NATO has used since.

More recent developments in the US have produced cartridges which will deliver greater effectiveness than the 5.56 mm while still being compact enough to be used in modified 5.56 mm guns.

The first of these was the 6.8 mm Remington SPC, developed with US Special Forces to deliver much improved terminal effectiveness out to 300 m while being fired from short-barrelled carbines.

By all accounts it succeeds admirably, although its long-range performance falls well short of the 7.62 mm. An alternative approach has been used for the 6.5 mm Grendel; a slimmer but longer bullet provides excellent aerodynamics, enabling the small cartridge to match the energy delivered by the 7.62 mm at 1,000 m. The weight and recoil of both of these cartridges fall roughly midway between 5.56 mm and 7.62 mm.

New developments in lightweight ammunition design may help to reduce the weight penalty for any new military cartridge, even if it utilises a larger calibre.

Next generation

The most fundamental question concerning the next generation of weapons is whether we should be retaining two different calibres or replacing both with one general-purpose

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round, which would equip all troops with rifles effective at all combat ranges, as they had in the past.

Ballistic analyses suggest that it is possible to develop a cartridge with the performance to replace both 5.56 mm and 7.62 mm; something like the 7 mm EM-2 at the top end of the calibre range, the 6.5 mm Grendel at the bottom. This should be examined by the UK and other NATO nations as a priority before re-equipment decisions are made.

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A more detailed study of these issues may be accessed at: www.quarry.nildram.co.uk/btb.pdf

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Cartridges with their bullets; from left to right: 7.62 mm NATO, 5.56 mm NATO, 6.8 mm Remington SPC, 6.5 mm Grendel, and the 7 mm EM-2 cartridge for comparison

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