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SKILLS AND SURVIVAL FOR ALL SITUATIONS

AK-47

HOW MUCH RANGE CAN YOU GET?

Given that the AR and the AK are the two most popular intermediate caliber small-arms on the planet and have been pitted against one another in conflicts since their respective adoptions it seems fitting to see how they stack up accuracy-wise.

BY **KEN JAVES** PHOTOS COURTESY **SHIBUMITACTICAL.COM**

See my previous article: "AR, M-16 and M-4: How Much Range Can You Get?" in Tactics and Preparedness issue 41.

Having recently participated in a couple of extended training evolutions where I had the opportunity to evaluate the capability of some "improved" M4 variants running quality match-grade ammunition, I can also provide an indicator of the capability of these carbines when paired with a top-of-the-line variable power optic. This resulted in much better performance, on average, than I found during the testing done for my previous article.

In this installment we will explore the precision capabilities of both a standard 7.62x39mm AKM-style carbine with soviet optics as well as a 5.56x45mm in a common defensive rifle configuration. We will then look at the performance *continued on next page*

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ONE OF THE TEST AKs WITH RUSSIAN OPTICS.

difference between an AK chambered in 5.56mm and a 5.56mm AR, to get an apples-to-apples comparison. Finally, we will examine some of the factors that make the difference in precision so pronounced between the two designs.

TEST EQUIPMENT

For this test I utilized an Arsenal SLR-107CR rifle chambered in 7.62x39mm with a 16.25-inch chrome-lined barrel with a 1:9.44 inch right hand twist. The optic was a fixed four power Romanian PSO scope that affixed (via its integrated mount) to the side accessory rail on the receiver of the rifle. No modifications were made to the rifle aside from mounting the optic and it was fired in its "stock" configuration. The 5.56mm rifle was an AK-102 with a 12.5 inch chrome-lined barrel with a 1:7 inch right hand twist. The optic was an Aimpoint T-1 fixed to an Ultimak gas tube optics mount.

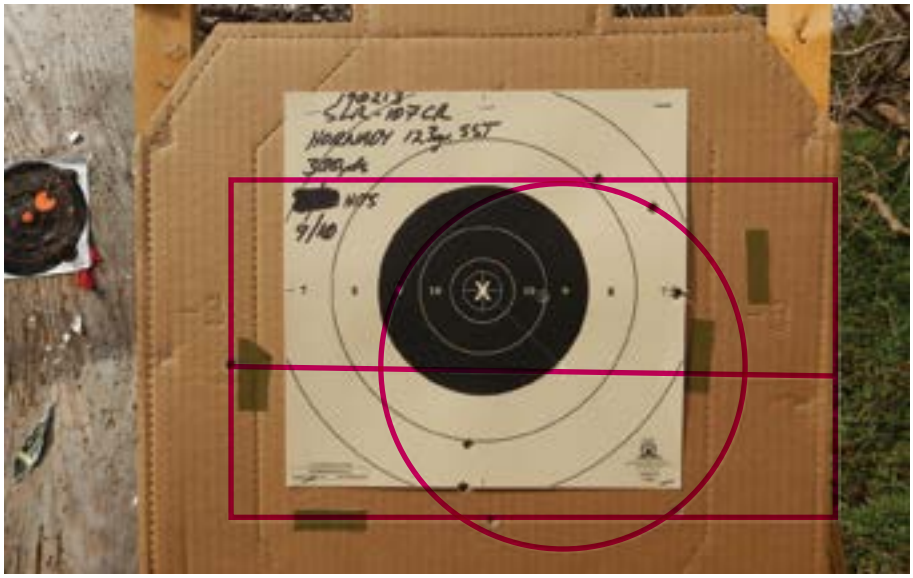
The Aimpoint was utilized due to the long eye relief required due to the mount location. The stock trigger and hammer on this rifle were replaced with an ALG Defense Enhanced AK Trigger in order to put the quality of trigger pull more on par with the AR for comparison purposes. A Bushnell Elite 1500 laser range finder was used to establish the distance to each target. I also used a Kestrel 3000 Weather Meter for gathering wind and environmental data paired with a Smartphone/tablet for GPS info and the Applied Ballistics Mobile application using ballistic coefficients provided by the bullet manufacturers for the ammunition used during the test. I can't emphasize enough how the use of a range-finder, weather meter and ballistics program dramatically reduces the learning curve, time and ammunition required to calculate and make hits at extended ranges; especially when travelling between different shooting environments as I did for this test. To determine the muzzle velocities generated by the test ammo I used a MagnetoSpeed V3 Chronograph.

For test ammunition I included two different varieties of Tula Ammunition (122 Grain Full Metal Jacket and 124 Grain Jacketed Hollow Point), which is commonly found in most stores carrying 7.62x39mm ammunition. In order to see what the AK would do with better quality ammo I included Hornady 123 Grain SST, which is the closest thing to match-grade ammunition I could track down for the AK. During the 5.56mm portion of the experiment I utilized Hornady 75 Grain Steel Match ammunition which I have found to be accurate and reliable in previous testing and would allow me to eliminate some variables and give a direct comparison between the AR and AK.

RESULTS

Range availability in my area limited me to testing at a maximum distance of 300 yards, however group sizes in Minutes of Angle

TULAMMO 122GR



HORNADY 123GR SST

300YDS

(MOA) tested at 100 and 300 yards can be accurately predicted and projected out to the distance where the bullet enters "transonic" flight; the point at which it begins to transition from super-sonic to sub-sonic velocities (around 1340 feet per second). This means that the tested group sizes should be consistent out to approximately 375 yards for the 122, 123 and 124 grain bullets and 450 yards for the 5.56mm 75 grain bullets. Beyond that point bullet instability as the projectile passes through the transition from super to subsonic results in unpredictable behavior and group size, typically opening up the group beyond the calculated size. The target I used at 300yds/274m was an IPSC silhouette with a B-8 repair center affixed to the middle as an aiming reference (the black portion of the target measures 5.5 inches in diameter). Firing conditions were very similar to the zeroing conditions for each ammunition type and consisted of firing at 13 feet elevation, 60 F, with a zero-value wind. Ten shots were fired at 300yds and the group size measured for each ammunition type. For the 300yd test I limited the 7.62x39mm ammunition to the 122 Grain TulAmmo FMJ and the 123 Grain Hornady SST as they gave me the best groups at 100yds. My elevation holds were calculated with the Applied Ballistics application and aiming references were placed on the target for each ammo type.

Ten shots with the 122gr Tula resulted in a 15-inch group (4.8 MOA) at 300yds. Ten shots with the 123gr Hornady SSTs resulted in a very similar 16-inch group (7.6 MOA). For the 5.56mm AK-102 the result at 300yds with the 75gr Hornady Steel Match was 15.8 inches (5.03 MOA). Group sizes were calculated with "OnTarget PC" a target analysis program that has proven excellent for this kind of testing.

Ten shots aren't really enough, from a statistical perspective, to give a true representation of the precision potential of the tested rifles at 200 and 300 yards. The minimum number to achieve 95 percent certainty (given the number of variables involved) is a test sample size of 30 rounds. Time limitations prevented me from firing 30 round groups at 200 and 300 yards, however I did fire 30 round groups during my initial testing at 100yds which provides a better indicator of the true group size potential with each ammunition type. The 100yd, 30-round groups resulted in 7.3 inches (7.3 MOA) for the 122gr Tula, 12 inches (12 MOA) for the 124gr HP Tula and 8.3 inches (8.3 MOA) for the 123gr Hornady SST ammunition. The Hornady 75gr Steel Match 5.56mm ammo resulted in a 6.7 inch (6.7 MOA) 30 round group at 100yds. I am convinced that 30 round groups fired at 200 and 300 yards would more closely match the MOA group size of those groups fired at 100 yards. When analyzing the group sizes from this test it is easy to draw the false conclusion that the group size is shrinking as the range increases. That would be very improbable from a physics standpoint as the angular dispersion of the bullets can only increase with range. The observed results are more a factor

5.56MM HORNADY 75GR STEEL MATCH

Manipulating a stock AK trigger feels like pulling on a sand-encrusted, uncooked spaghetti noodle.


TULAMMO 122GR


TULAMMO 124GR HP


HORNADY 123GR SST


HORNADY 77GR SMAK 102

100YDS

AMMUNITION TYPE	AVERAGE VELOCITY	100YD GROUP (30 RNDS)	200YD GROUP (10 RNDS)	300YD GROUP (10 RNDS)	300YD GROUP (30RNDS PROJECTED)
Tula 122gr FMJ	2326 fps	7.34 MOA	6.47 MOA	4.80 MOA	23.05"
Tula 124gr HP	2294 fps	11.98 MOA	N/A	N/A	37.63"
Hornady 123gr SST	2322 fps	8.30 MOA	5.66 MOA	7.61 MOA	26.07"
Hornady 75gr SM	2365 fps	6.66 MOA	4.72 MOA	5.03 MOA	20.92"

of small sample size at the longer distances and statistical error than evidence that the rifle is more precise at longer ranges. If we project the 30 round group sizes observed at 100yds to 300yds the resultant group sizes would be: 23 inches for the 122gr FMJ Tula, 37.6 inches for the 124gr HP Tula, 26 inches for the 123gr Hornady SST from the Arsenal SLR-107, and 21 inches for 5.56mm Hornady 75gr Steel Match from the AK-102. The projected data shows that hitting a man-sized target, even at 300 yards, is a dicey proposition at best with an AK style rifle and I wouldn't attempt precision shots at any distance farther. This means that the gradations to 800m on the rear iron sight are extremely optimistic, except for engaging an area target.

PROCESS

I began by zeroing the rifles at 100yds and collecting velocity data for both rifles and the ammunition I planned to use. I also collected the environmental data for the zeroing conditions as the ballistic solver will use this as a baseline to compare against and calculate from when firing in a different environment (altitude, temperature, barometric pressure; all are factors that affect the flight of a projectile). Ideally, for the most accurate input and realistic bullet drop, you would want to zero as far out as possible which aids in determining how closely the ballistic model matches reality for your rifle/ammo combination. Once the rifles were zeroed, I fired the initial 30 round baseline groups as 6 sets of 5 rounds in order to prevent the effects of shooter and eye fatigue from presenting themselves as errors in the shot group. The data from the 100-yard groups was then used to generate the firing solutions for the testing at 200 and 300 yards.

AK VS. AR

As mentioned earlier, I selected the AK-102 with the 12.5 inch barrel in order to do a direct performance comparison with an AR with a 12.5 inch, 1:7 inch twist barrel that I have previously tested with the same lot of Hornady 75gr Steel Match ammunition. In order to reduce the number of variables and attempt to provide a pure comparison between the precision potential of a modern AR and AK I improved the trigger of the AK-102 by installing an enhanced AK trigger from ALG Defense. To cut to the chase; there is no competition when it comes to precision when comparing a quality AR to a quality AK. The best 100yd groups I could generate with the AK-102 measured 6.66 minute of angle (MOA) while the AR easily printed 2.55 MOA groups at 2410 fps (temperature corrected) and allowed me to easily hit a head-sized target at 500 yards.

LIMITATIONS

Due to the design and manufacture of the AK pattern rifle there are a number of inherent limitations on its accuracy potential, some can be upgraded and improved easily and some cannot.

The first is quality ammunition. Swapping out ammo is probably the most cost-effective solution that offers the greatest gain in precision. Unfortunately, there are few options for high ballistic coefficient and consistent projectiles in 7.62x39mm. You can see the

12.5-INCH BARREL AR WITH HORNADY 75GR. SM AT 100YDS

difference between a 124gr Tula projectile, 5.56mm 75gr Match FMJBT projectile and a 123gr Hornady SST. The length to width ratio and streamlined profile of the 5.56mm bullet is very apparent when placed next to the 7.62mm projectiles. A comparison of ballistic coefficients (the ease of the projectile's penetration of the air and resistance to deflection) gives a significant advantage to the 5.56mm bullet; a .395 vs. .295 G1 BC. Although the 5.56mm projectile showed a

FROM LEFT TO RIGHT: 122GR TULA, 75GR FMJBT MATCH, 123GR SST.

slight accuracy advantage over the 7.62mm projectiles in the AK it wasn't as significant as its BC would suggest. This means that accuracy is being undermined somewhere else in the system. Also, the less consistent (from a velocity comparison) 122gr Tula cartridge outperformed the much better constructed and consistent 123gr Hornady SST in this rifle. The sealed base and more even pressure distribution should have favored the SST in this test; however, it turned in some disappointing numbers.

If the quality of the ammunition isn't the culprit, let's examine some of the other factors that can contribute to large group sizes.

When compared to other, more precise, rifle designs you will notice that the barrel of an AK is thin for the caliber; resulting in much more barrel flex during firing. The long-stroke gas piston operating system also fixes a large moving mass to the top of the barrel that slams back and forth, resulting in additional flex and vibration in the barrel every time a shot is fired. To achieve the legendary reliability for which the AK is known, loose tolerances around the gas piston and a large volume of gas is required to cycle the weapon. To satisfy the gas requirement a much larger gas port must be to be drilled into the barrel (0.1285" for 7.62 and 0.077" for 5.56 vs. roughly 0.065"-0.07" for a typical AR). The larger hole in the barrel (and how well it was drilled) can reduce accuracy by shaving tiny amounts of material from the bullet jacket as it passes which unbalances the projectile as it is rotating at roughly 175,000 rpm. A higher quality barrel can increase the precision of the rifle, offering more consistency; however, swapping an AK barrel is a process that is significantly more involved than changing an AR barrel. The gas system can also be tuned by reducing the gas port size, but if it is done improperly it can reduce the overall reliability of the system. The lack of a hand-guard system that allows the barrel to free-float also means that any pressure applied to the hand-guard is translated directly to the barrel, resulting in shifts to the point of impact.

Aside from the mechanical factors that can degrade the accuracy potential of AK-style weapons there are ergonomic factors to consider as well. The first is the quality of the trigger. Manipulating a stock AK trigger feels much more like pulling on a sand-encrusted, uncooked spaghetti noodle than the sought-after "glass rod" break a good precision trigger provides. Another factor is the design of the butt-stock. Its' short length was intended to allow the shooter to shoulder the weapon effectively while wearing heavy winter clothing and the low comb allows proper use of the low-slung iron sights. Unfortunately, this means that the original stock is not well suited for the use of optics. For this test, I had to build an improvised cheek piece to achieve consistent eye placement and relief with the soviet PSO scope, since it has both a vertical and horizontal offset (to allow it to clear the dust cover and iron sights). Fortunately, replacing triggers and stocks is a much easier process than changing out a barrel. An examination of the qualities of soviet-style optics may be a topic for another day, but I can definitely say their use did not make the testing process easier….

CONCLUSIONS

The AK-47, much like the M4 Carbine, was never intended to be a weapon of great precision. An AK of quality construction is capable of hitting a man-sized target at 300 yards under favorable conditions, but the inherent design limitations present in the platform make it much more difficult to enhance the capability of an AK when compared to the ability to readily improve performance for a quality AR. Visit www.shibumitactical.com/articles.html for my initial velocity data and group size comparisons. ✓

BIO

*Ken Javes (**www.shibumitactical.com**) has over 19 years of military and security contracting experience to include multiple combat and contract deployments to South West Asia. He has served with Marine Infantry and Force Reconnaissance units. He possesses instructor certifications from multiple agencies and organizations, and has trained with some of the top military and competitive shooters in the country.*