The Los Angeles Silhouette Club

Cast Hollow Points: The Next Generation

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Back in the days of the black powder express cartridges, bullets were hollow-pointed not to enhance expansion, but rather to make a lighter, faster bullet. The hollow point accomplished this without changing the bullet length, thereby allowing the same twist rate to be used to stabilize the lighter bullet. In the last quarter of the 19th century, most of the bullets that were loaded into these express cartridges were made of very soft alloy (30:1 lead/tin was popular). As a result even blunt, solid-nosed cast bullets expanded upon impact with muscle and bone, and when the projectile weighed 400-500 grains (or even more), a devastating wound channel was left in its wake. The express cartridge cast HP was no different when launched at black powder rifle velocities, so perhaps it's easy to see why the added velocity, and not the expansion properties of the HP, were the focal point of early hot-stove discussions.

Later, experimentation revealed that the impact behavior of moderate velocity handgun bullets could be dramatically enhanced by incorporating a hollow point. Industrious handgunners experimented by filling these cavities with all manner of stuff (wax, garlic, primers, explosives, etc.) to make these bullets more devastating, but the simple fact remained, the hollow point bullet was the key feature responsible for the increased killing effect of these exotic concoctions. In fact, it can be argued that the hollow point bullet is one of the most important advances in the development of modern handgun ammunition. Elmer Keith recognized this early on, and around 1930 incorporated hollow points into his pet SWC designs (358439, 429421 HP and 454424 HP). His detailed reports of their accuracy, expansion and deadly performance on small and medium game highlighted the shooting literature for decades. Ray Thompson followed suit in the 50's with his gas-checked SWC-HP's (358156 HP and 429244 HP). These cast HP's are all excellent hunting bullets.

It is important to recognize that all of these mould designs were drawn up in a day and age when the prevailing practice was to cast revolver bullets of a binary alloy composed of only lead and tin (usually somewhere in the range of 15:1 to 20:1 lead/tin). These lead/tin alloys are not only soft enough to expand smoothly at handgun velocities, but they are also malleable enough to hold together and avoid fracturing and fragmentation upon impact, leading to excellent weight retention and penetration. A large diameter cavity was not necessary to induce expansion in these soft alloys, and since the binary lead/tin alloys are not prone to fragmentation, the cavity could be made to go rather deep into the heart of the bullet. Thus, Elmer Keith designed his HP's to have a cavity that was approximately 1/8" in diameter, roughly straight-walled (with a slight taper at the bottom of the cavity), that ran about half the length of the bullet. He preferred his bullets cast of a 16:1 alloy (8 lbs lead + 8 ounces tin) for use at 1200 fps or so. His was a recipe that worked; these cast HP's were deadly.

In the 40's and 50's, others like Gordon Boser and John Zlatich also experimented with these (and other similar) cast HP's, and varied the alloy composition and cavity design. Their careful and systematic experimentation can be summarized as follows: these traditional HP's expand beautifully at 1200 fps when cast of 10:1 alloy, but are reluctant to do so at slower speeds; a 20:1 alloy expands very nicely from about 900-1200 fps, and a 40:1 alloy does well from about 800-1000 fps, fragmenting badly at 1200 fps. At 1500 fps, all alloys tested fragmented. Type metal HP's did not expand at all at 800 fps and shattered at higher velocities. (I'd like to thank Taffin for sharing these articles from the 40s and 50s with me).

In short, the Keith and Thompson HP's were designed around the concept of binary alloys, specifically lead/tin alloys in the range of 15:1 to 20:1 and this is where they perform their best.

In more recent years, virtually all revolver bullets are cast from more complex alloys (most commonly scrap wheel-weights), that contain antimony, arsenic and other metals. Antimony has the benefit of hardening bullet metal much more efficiently (and cheaply) than does tin, but it does so at the expense of increased brittleness. There have been contradictory reports published about the expansion properties (or lack thereof) of the Keith and Thompson HP designs in recent years as a result of people using these harder, more brittle, antimony-containing alloys. In a nutshell, experience has shown that the thin-walled 358439 cast of WW alloy (3-4% antimony and about 0.7% tin) will expand reliably at 1000 fps. However, the .44 and .45 caliber HP's, with their thicker walls surrounding the HP cavity, need considerably more velocity to expand when cast of WW alloy. Unfortunately, coupling the higher antimony content with the higher velocities can result in bullet fragmentation if pushed too far. With the deep cavities found on these traditional designs, that can result in substantial weight loss. To get the best performance from these larger caliber HP's, it is best to keep the antimony content low and make sure the tin content is adequate. This is because the antimony-induced brittleness can be offset somewhat by adding a small amount of tin. Tin binds to the antimony, forming an intermetallic compound that is soluble in the molten lead alloy and has less tendency (than antimony) to phase separate upon cooling. Thus, the resultant bullet metal is less brittle and more malleable than the starting WW alloy. Antimony is soluble in lead to the tune of about 1.5%, so by adding 2% tin (which in turn binds and solubilizes 2% of the antimony) the phase separation problem (and hence brittleness) of WW alloy is significantly attenuated. This alloy is even better for cast HP's if it's diluted with 10-20% pure lead, which serves to both soften the alloy slightly and dilute the remaining unbound antimony, insuring that it is below the 1.5% solubility limit (and hence, doesn't phase segregate).


Lyman 429640 HP

Pure tin is expensive and we don't run across it today as readily as the old-timers did, so the binary alloys are less commonly used today and almost everybody uses WW alloy to cast their bullets. In addition, the Keith and Thompson HP moulds are getting harder to find. Does this mean that the concept of cast HP's is past it's prime and all we can do is cast a nostalgic eye back upon the pages of history (and *Sixguns*) and dream of better, by-gone days? Nope. We can revisit the concept of the cast HP and redesign it to better fit the alloys that we *do* have available today. This is precisely what Lyman has done with their line of Devastator HP's in 9mm,

.40 and .45 caliber for semi-auto cartridges, along with a GC design for the .44 Magnum. The .44 design (#429640 HP) is clearly a hunting bullet, designed with deer, black bear and elk in mind (the short, light semi-auto designs are better suited for vermin). The 429640 HP has a large diameter, conical cavity, designed to induce expansion even when cast of a harder alloy like WW. The cavity only extends down about 1/3 the length of the bullet, so even if the forward "petals" of the mushroomed bullet break off as it passes through the vitals, there is still a 200+ grain solid wadcutter to punch on through the other side of the animal. If this performance strategy reminds you of the H-mantle and partition bullets, then you get a gold star and can move to the front of the class. This is clearly a design concept that works.

When casting any HP bullet, it is important to remember to turn the pot temperature up a little bit (30-40 degrees, or so) and cast quickly to keep the HP "spud" in the hot mould as much as possible (and therefore up to temperature), or else you'll have a very high reject rate. Also, the addition of a small amount of tin helps to lower the surface tension of the molten alloy, insuring that the bullets fill out properly around the HP cavity. The 429640 HP's drop from my mould at 260 grains when cast with WW alloy + 2% tin (checked and lubed they weigh 268 grains). The gaping mouth of the monstrous HP cavity is over ¼" wide! 22.5 grains of W296 underneath the 429640 HP, sparked with a CCI 350 primer, provided exceptional accuracy from a 7 ½" Liberty Model Super Blackhawk (1410 fps). Good accuracy was also obtained with this combination from a 6" S&W 629 Classic Hunter (1304 fps). This is a very sleek, streamlined bullet that shoots very flat and hits very hard.

A late season doe tag was chosen as a suitable opportunity to try out the 429640 HP in the field. The basalt-encrusted canyons of the Snake River can be an inhospitable place in mid-November, but not this year. Temperatures stayed in the low-40s and the skies were clear and sunny, with little wind (that's a first!). The first day out we found that the deer weren't in all of their usual brushy canyon hangouts. Instead, we found that water was in limited supply and they were primarily in those canyons with permanent water supplies. That afternoon we found the deer (I stopped counting at 50), but there were no shot opportunities inside of 125 yards (except for that goofy little forkhorn that walked within 10 yards of me). The next morning, deep in the heart of that same canyon, Ed made a textbook perfect heart shot from over 200 yards with his 7-30 Waters Contender, and the 140 grain Nosler Ballistic Tip turned in its usual outstanding performance. As Terry moved into position to help Ed out with his packing chores, he pushed a group of deer up-canyon and right into my lap. A yearling came running up to within 15 yards of me, and stopped behind the only brush on the entire slope (for those of you who haven't been here, the Snake River is wide open country). The second deer on the scene was a nice sized mulie doe, moving from my right to left. She stopped at about 30 yards and the 629's black on black sights came to bear on her left shoulder. The metallic click of the hammer being cocked spooked her, turning her back to my right. My outline was pretty well broken up by a basalt outcrop, so she had a hard time picking out exactly where the sound had come from, and stopped after taking only two steps. As the sights swung back across her, I overswept the heart/lung area and came to a stop on the neck. It wasn't so much of a conscious decision to take a neck shot as much as it was a go/no-go decision based on acceptable sight picture and the need to shoot quickly (both animals were skittish and likely to leave quickly). The bullet impact was clearly audible even at this close

range, and she collapsed at the shot, tumbling downhill through the brambles and basalt skree, to the bottom of the draw 100 yards below, scattering the other 7-8 deer in the group (including 3 nice bucks). Being a direct hit on the spine, a .38 target wadcutter would have been just as lethal, but a post-mortem examination of the wound channel made it clear that this bullet had expanded very effectively, induced massive soft-tissue damage, shattered the spine and exited to fly off towards the far side of the canyon. In short, it lived up to its "Devastator" label. One bullet and one animal don't prove much, but I suspect that the 429640 HP could get to be very popular in handgun hunting circles. Now that I've had the chance to work up some loads and hunt with the 429640 HP, I, for one, am favorably impressed.

The HP is one of the most significant advances made in the on-going evolution of handgun ammunition. The classic designs put forward by Elmer Keith have proven themselves for decades in the hunting fields. These moulds are hard to come by today and are perhaps best served by binary lead/tin alloys that are used less and less often these days due to the cost and availability of tin. The new line of Devastator HP's from Lyman is very well-suited for today's most common bullet metal, scrap wheel-weights. I believe that this bullet will prove every bit as deadly as Elmer Keith's HP's. Now if they would just make one for the .45 Colt, about 290 grains, plain-based, with a Keith-style grease groove....

- Glen E. Fryxell

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