The Los Angeles Silhouette Club

The Origins of Magnum Performance

By: Glen E. Fryxell and Robert L. Applegate

In 1937 Phil Sharpe published the "Complete Guide to Handloading", which is arguably the single best handloading reference ever published. In this tome, he summarizes his extensive testing in the development of the .357 Magnum, and the dominant role that cast bullets played in that development. The bullets used by Sharpe in this project were primarily the 146 grain Sharpe HP and the 156 grain Sharpe "solid" (what we would call a SWC today), but included a wide variety of others as well. Both of the Sharpe bullets took their inspiration from Elmer Keith's SWC and HP (Ideal 358429 and 358439, respectively), shortened to approximately 5/6 their original length. This was done because Keith had designed his bullets in the 1929-1931 timeframe specifically for the .38/44 .38 Special N-frame guns (the Heavy Duty and Outdoorsman), and the shorter cartridge case left more room in the forward portion of the cylinder for a long-nosed bullet, so Keith designed a long-nosed bullet. Phil Sharpe was working closely with Colonel D. B. Wesson (Vice President of Smith & Wesson) and knew that S&W was going to use the same length cylinder in the soon-to-be-released .357 Magnum, meaning that the bullet nose would need to be shorter, since the cartridge case itself was longer. Sharpe turned to George Hensley, a relative newcomer in the mould-making business (having only been in the business for a few years at this point), to have these moulds made, and Hensley quickly earned Sharpe's respect with his exceptional craftsmanship. The Sharpe HP and solid were both notably lighter than the Keith bullets, and as a result, velocities were considerably higher with the Sharpe bullets. The loads that Sharpe worked up for the new Magnum produced velocities of an unheard of 1500-1600 fps. Bullet performance of the Sharpe HP was both spectacular and explosive. The .357 Magnum was officially unveiled in 1935, and the rest, as they say, is history.

George Hensley #51 -- the "Sharpe solid" used in the development of the .357 Magnum cartridge (this mould pre-dates Hensley's 1937 partnership with James Gibbs, making it contemporary with the introduction of the .357 Magnum).

The whole course of firearms history as we know it might have been very different had Colt developed the .357 Magnum instead of S&W. In a way, Colt did play a role in the development of the .357 Magnum. Colt introduced the .38 Super Automatic cartridge to help fill a need by Police Officers for a cartridge with better penetration capabilities than the standard .38 Special revolver. This in turn caused many of S&W's customers to purchase the new Colt semi-auto pistol chambered for this new "Super" cartridge which would penetrate the WW1 body

armor as used by many members of organized crime and would also penetrate the newly introduced bullet proof glass that was being used by the same fraternity. For S&W to maintain their reputation as the manufacturer of the worlds best revolver and their position in industry as a manufacturing giant, it was necessary for them to develop a cartridge and handgun to go with it that would surpass the new requirements of the various law enforcement agencies (not to mention Colt's .38 Super). Thus, began the quest of S&W, which led to the .38-44, and subsequently the still very popular .357 Magnum. Keith's contribution to this effort was to demonstrate that the N-frame .38/44 could safely handle this level of pressures. He did this by developing loads in the early 1930s using DuPont #80 powder and his 173 grain SWC and 154 grain HP cast bullets, loaded to about 1100 fps velocity. When 2400 was released in 1933, Keith quickly found it to be a superior powder for this application, and used it to step his loads up to 1200-1300 fps. He summarized these experiments in "Sixgun Cartridges and Loads", published in 1936.


S&W .38/44 Outdoorsman from 1932.

Generally when we think of the .357 Magnum today, we tend to think in terms of either jacketed bullets or hard-cast SWC's . We commonly think of 158-180 grain bullets at 1200-1350 fps, or 125 grain bullets at 1450 fps for home-defense or law enforcement applications. Savvy silhouetter's have also loaded heavy cast bullets (e.g. 200 grain) to 1200 fps in the .357 Magnum to convince stubborn rams that they needed to fall down. It is strangely ironic however, that the bullet that ushered in the era of magnum performance, an intermediate weight (between 125 and 158 grains) cast HP, is entirely absent from today's handgunning scene.

In general, cast bullets are driven faster than jacketed bullets of the same weight with the same powder charge since less energy is used to engrave the bullet and the cast bullet puts up less frictional resistance as it glides down the barrel. Therefore, cast HP's tend to deliver higher velocities at lower pressures than do JHP's of the same weight, and consequently expand more readily than do jacketed bullets. For many years Keith tirelessly promoted the use of his HP design (Ideal 358439) in the .357 Magnum, but this effort was somewhat dampened by his bullets being too long (when loaded into magnum cases and crimped in the crimp groove) to fit in the cylinders of the most popular .357 of the day: the S&W N-frame .357 Magnum. The only way to make these bullets work was to seat them very deeply and crimp the case over the forward driving band, or to use .38 Special brass (Keith's preferred solution); either way, velocity suffered somewhat due to the loss of case capacity. Keith's 358439 is an exceptional bullet and provides excellent performance out of the more modern guns that it's compatible with. However, it is not the bullet that Phil Sharpe used to develop the .357 Magnum.

The Lyman 358477 dates back to the 1950s and has a shorter nose to be compatible with the shorter cylinders of the early Magnums. This nose is quite

similar to the ogive/meplat that Hensley cut for Sharpe (compare Figures 1 and 3; the nose of the 358477 appears to be a little longer and narrower in the photos because the driving bands are a little thinner, in reality the length of the bullets forward of the crimping groove are within about .010" of one another, and both are about .050" shorter than the Keith). The main differences between these two bullets are the shapes of the grease grooves, a small difference in the width of the driving bands and a few grains of bullet weight. Based on the cherry number, the 358477 might have first been made as early as 1952 (cherry number 476 was the highest number listed in 1951), but it wasn't officially cataloged until 1957 (Lyman Handbook #41). The timing of this introduction is significant because the .357 Magnum was quite popular by the mid 1950s, fueled by the 1955 S&W introduction of the immensely popular 4" barreled K-frame Combat Magnum (later known as the Model 19). A lighter, faster bullet that captured the desirable features of the Keith SWC and the extraordinary velocities of Sharpe's early testing was called for. The 150 grain 358477 was Lyman's response.

The 358477 quickly became a popular cast bullet for the .357 Magnum. Lyman's 1958 "Handbook of Cast Bullets" lists shooters' testimonials labeling it as a favorite bullet in both the .38 Special and the .357 Magnum, even western hunters reporting its use over stiff loads of 2400 to take mule deer. Originally, the 358477 weighed 150 grains, but over the years Lyman has altered the 358477 design to make the grease groove smaller, the driving bands wider and the nose shorter, resulting in a 158 grain bullet that is seated more deeply into the cartridge case. I am quite fond of the older 150 grain version. It is an excellent bullet in both .357 Magnum and the .38 Special.

My own experience with the 358477 goes back to the 1980s to when I was getting started in bullet casting. A buddy of mine happened across an older 2-cavity Lyman 358477 mould at a gunshow for $5, bought it, and handed it to me, saying, "Here, everybody should have a good .38 SWC mould". That mould sat unused for a while on my casting bench because I had a 6-cavity aluminum mould in a similar bullet weight that made a mountain of bullets in a hurry. Accuracy was acceptable, not great, with these mass-produced bullets, but I just chalked that up to my own inexperience and the limitations of cast bullets. Nope, sorry, wrong answer. Curiosity eventually got the best of me and I sat down and cast up a batch of 358477s and put together some test loads in both .38 Special and .357 Magnum (if memory serves, those loads involved 4.0 grains of Bullseye and 14.0 grains of 2400, respectively).

Accuracy improved significantly relative to the mass-produced bullet (group size was basically cut in half), and the leading problems that plagued the other bullet disappeared entirely. Since that time I have bought several more 358477 moulds, both in the original 150 grain design and the more recent 158 grain version. Over time, some of these moulds have moved down the line, and eventually I have ended up with a pair of 4-cavity 358477s. Interestingly, both of these moulds are stamped "Ideal", a practice which I believe was dropped around 1958, meaning that both of these moulds are very early production of

this particular design (both in terms of the 358477 cherry used to cut the mould, and in terms of the 4-cavity blocks, which were introduced in 1958). These moulds have cast a pile of bullets for my revolvers over the years, as the 358477 in .38 Special is one of my all-time favorite plinking and varmint hunting combinations.


Ideal 4-cavity 358477 mould.

For many years I was looking for a HP version of the 358477, but was unable to find one (or even find mention of one), so I finally broke down and did a little lathe work to convert an older Ideal single cavity 358477 to drop HP bullets. This 140 grain bullet bears some notable similarities to the 146 grain Sharpe HP in terms of weight, profile and performance. I didn't use Sharpe's original cavity design (.100" diameter and square-cut bottom), preferring instead to use more of a Keith-style cavity that started out at .160" diameter, tapered and rounded off (Keith used tapered cavities between .140" and .170" in his HP mould designs). The tapered/rounded HP pin allows the alloy to flow around the pin with less turbulence, resulting in fewer trapped air pockets and therefore fewer defective bullets. As luck would have it, about a month after I finished this conversion, I stumbled across a factory 358477 HP, so I can now compare my handiwork to the factory version.

Apparently, the Lyman factory was thinking along the same lines I was when I made my mould, as they made their HP channel about .140". The HP pin was missing from this mould and I haven't gotten around to making a new one yet.


The homemade Ideal 358477 HP.

The factory Lyman 358477 HP (missing the HP pin).

OK, so now we've got the moulds, how does the 358477 HP cast, shoot and expand? Bullets were cast of WW alloy with 2% added tin for the .357 Magnum, and 20-to-1 (lead to tin) for the .38 Special. All were sized .358" and lubed with homemade Moly lube (equal parts by weight beeswax and Moly grease). .357 Magnum loads were assembled using 15.0 grains of 2400 and CCI 550 primers. Accuracy was excellent, and velocities were 1571 fps from an 8 3/8" S&W 586, and 1502 fps from a 6" S&W 686 Classic Hunter. These velocities are virtually identical to those reported by Sharpe. The barrels were clean, with no leading observed. Expansion testing was carried out by shooting 2L plastic bottles filled with water, laid on their sides and penetrated lengthwise. This manner of testing usually involves the shooter getting wet (a welcome relief on a hot, dusty July afternoon!), but not this time. Expansion of the 358477 HP was so violent at 1600 fps that it simply misted the entire 2L contents of the water bottles! There were no droplets big enough to make it

back to the shooter, just a 20 foot sphere of something that more closely resembled fog than a spray of water. Expansion at these velocities was more vigorous and explosive than any other bullet I have ever used in the .357 Magnum, including Elmer Keith's 358439 (this is not a statement that I make lightly, I am a huge fan of Mr. Keith's HP design). Doubtless, the rapid expansion is due to the higher velocities possible with this lighter bullet, but nonetheless, it's easy to see where Mr. Sharpe's enthusiasm and awe came from during his development of the .357 Magnum cartridge.

4.4 grains of Bullseye was used in the .38 Special evaluation of this HP, which also delivered excellent accuracy, and velocities ran 956 fps from a 6" K-38 Masterpiece and just over 1000 fps from an 8 3/8" Model 14. Tests revealed that expansion is minimal at these speeds when this bullet is cast out of WW alloy, but that it expands beautifully when cast of 20-to-1 alloy (see recovered bullet in Figure 6). Very similar results were reported by Phil Sharpe on page 280 of his "Complete Guide to Handloading".

.38 Special and 358477 HP; loaded round, as-cast bullet, and bullet recovered after being fired into water at 1000 fps.

OK, so who cares about bullet expansion in water bottles? What does this bullet do on living, breathing flesh? Taking this bullet into the field to hunt vermin provided confirmation for the water testing results. When loaded in the .357 Magnum to almost 1600 fps, the 358477 HP delivered a flat trajectory and expanded in highly explosive fashion. When loaded into the .38 Special at 1000 fps and cast of 20-to-1, the 358477 HP hit hard, with reliable, controlled expansion. In summary, this bullet allows the shooter to get every last bit of performance possible out of each of these fine cartridges. This is an excellent bullet and one that defines magnum performance. Just like Mr. Sharpe told us it did back in 1935.

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