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CENTIMETER: The Cartridge Click here to read about the Centimeter Pistol

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From the ballistician who gave us the 10mm Auto now comes the Centimeter cartridge.

By Whit Collins

Design Problem: "Construct a pistol loading of major IPSC power; one which retains the combined advantages of other competitive IPSC rounds, without their disadvantages."

"As a corollary requirement, make this loading adaptable to the largest possible number of handguns which are IPSC-capable in ergonomic, dynamic and ballistic qualities."

Given the wealth of creative design thought presently being expended on IPSC-related technology, this problem is not a simple one. Revolutionary solutions to design problems are seldom accepted in the conservative world of shooting sports. So, rocket power, particle-beam acceleration, and psychokinetic projection were quickly?very quickly?dismissed.

One way into a knotty design problem is to choose a known benchmark and then chart a course to a higher altitude. This writer had one advantage: I could compare two possible benchmarks: one well-known to all IPSC shooters, the second much less so.

The most visible of these IPSC benchmarks is the current gamesman's adaptation of .38 Super Colt. Readers familiar with my past work already know that another possible benchmark is my original Centimeter round. If you are not, the Cm can be simply described as a straight wall auto-loading cartridge of .401" bore diameter, having an overall length of not more than 1.169".

Super .38 was first on the market in 1900 as the .38 Colt Auto. The Cm was first fired experimentally and published in an early form in 1972. Both have come through several stages of development since then.

The Super has been the gamesman's answer to IPSC Major Caliber match requirements up to now. Its main advantages are:

1) It was originally re-designed, in 1927, for the 1911 Colt. The big Colt is the ergonomic "package" that still wins most matches.

2) A 1O-round magazine capacity can be had with Super in any 1911 system. This is the Super's really key advantage.

3) Momentum of Super muzzle gases, although almost identical to .45 ACP gamesman's loads, does come in a column exiting at higher speed, giving better muzzle control than .45 ACP when used to power a compensator.

4) There is less perceived torque-moment in the Super's recoil, as compared with the .45. Bullets are lighter across the board, no matter how close the muzzle impulse to .45. In general, there is a noticeable improvement in the .38's controllability compared to .45.

The stress of competition turns even small improvements into big advantages, so the Super is winning IPSC matches today. Yet, its adaptation to IPSC gamesmanship has also brought serious drawbacks into play:

1) The main problem lies in the chamber pressures necessary to bring Super into a full power factor of 170 of better. As it is limited to installation in 1911 systems, the IPSC Super's gas-handling problems force extensive rework of the basic gun. Different smiths have different proprietary methods, but the best have all developed means of enclosing the breech face within the barrel for full support of the case head. This brings changes in all the 1911's feed-cycle surfaces and geometry of the system. It also brings quite high costs, if the pistol is a full competition piece with all other IPSC bells and whistles.

Without an enclosed and supported casehead, the dreaded "Super Face" will ultimately occur. Even new brass may have a percentage of weak points that can "trap-door," blowing out in the classic .38 Super three-sided vent

The 35,000 psi-plus levels needed to meet major caliber in the Super can make for a case failure that sifts plenty of hot brass out through the 1911s slide rails and frame clearances. Report and recoil may be like a "puff load, but there is usually enough blast and particle sting about the face and hands to be unmistakable. Wear your shooting glasses any time you're on the range, heavy loads or not.

A really harsh blowout from an unsafe load will also force the Super's magazine out of the grip frame. Occasionally, double charges of fast powders split the mag's seams and detonate one or more rounds in the top of the stick.

2) A second much-noted drawback to stressing the .38 Super is that of erratic accuracy. It gets back to the crux of all gun systems: bore expansion characteristics and, their dynamics at muzzle exit.

The Super's powder column is long in comparison to bore diameter/bullet base. Turbulence from powders of necessarily rapid burning rates goes on far into the barrel's length. Multiple vibrations and shock waves are set up in the leading edge of the propellant gases. When this powerful column of still-dynamic gases reaches the muzzle, there is a wide variation in the pressures oh the bullet's base as it exits.

When a ballistic delivery system is over-stressed, even slight variables make errors out of proportion to the components involved. The only way to make an IPSC Super more consistently accurate is to either lower the stress on the cartridge, or further complicate gun modifications. From a design standpoint, just the two points above justify a trip back to the drawing board.

Requirements for a new IPSC benchmark:

1) As stated before, it should be adaptable not only to the 1911 system, but also to others having specific advantages for lPSC. These might be a high magazine capacity, or improved handling qualities resulting from a more compact action and control loop.

2) This benchmark's momentum values, both at the ballistic pendulum and in its muzzle-gas impulse should be usefully higher than the Super's without stressing the system. Chamber pressures should be moderate, nor near-overloads.

3) As a corollary to the above, adaptation should be much closer to "drop-in" in any pistol. Elaborate rebuilding of breeching or feed-cycle surfaces should not be needed.

4) A subsidiary requirement would be to hold bullet weights below those of IPSC .45 loads, for primary control of recoil forces before compensation.

5) Interior gas-handling performance should give an advantageous expansion column of larger diameter, even if similar in momentum impulse to Super's. This would permit a more compact and efficient compensation system to be installed.

6) As a result of the efficiencies achieved by the above design targets, accuracy potential should be high and demonstrably consistent.

It should be obvious to the reader, once you've read this article and the one on the Centimeter pistol, that Paul Liebenberg of Pistol Dynamics, and myself, firmly believe that the.401-bore, 9mm P-cycle length Centimeter is the IPSC round of the future.

If you will bear with me for one more list of points:

1) The Cm round has proven excellently adaptable to any 1911 Colt or near-copy system. Better, in fact, than the .38 Super conversions. Paul starts with a 9mm Colt slide and does relatively minimum proprietary alteration to the top end. .45 ACP magazines work with no changes, holding nine rounds. Paul claims he will produce custom mags of ten rounds. His IPSC conversion is as close to "drop-in as you can get, and still have a major caliber-competitive gun. Additionally, the Cm adapts to many 9mm systems. The earliest version of the Cm was converted into a Browning High Power, and functioned fairly well. The offset trigger link- age and related clearance problems stopped development early, but the Cm can be made to work well through large-capacity staggered-column magazines. Pistol Dynamics is working on adaptation "kits" for several non-Colt systems.

2) An IPSC gamesman's load in the Super requires a propellant charge of fast powder, in a column height of .500" or more, to generate momentum level of .385 to .395 pounds-feet per second. The same level of momentum is created in the Cm using a .370" column of bulkier, more progressive powder. Cm powder gases exit the muzzle more evenly burned. This is a large-diameter, high-speed volume of gas which gives very useable levels of compensator flow, while holding chamber pressures at 30,000 psi in five-inch barrels.

3) The .401 bullet's piston area allows a wide range of throw weights, ranging from just below 140 grains to just above 200 grains. Lead-bullet loads of 165 grains, 1075 fps are proving to be optimum for IPSC, giving power factor of l77.

Super, Centimeter and .45 ACP all actually have the same momentum levels in gamesman's loadings, as well as kinetic energy. However, the Cm's piston area gives slightly over 4000 psi at the breech face, from a 30,000 psi load. The Super's 35,000 psi level gives 3300-odd psi breech-face pressure. Very similar levels of recoil and action function, but much lower stress on the Cm's gun, other things being equal.

4) Real firearm performance is measured in its exterior ballistics and target effect. Accuracy is reliably high in the smooth shooting Cm loads. Consistent gas pressures provide efficient muzzle exits. Even in my earliest, single-shot test fixtures, the Cm bullets would cut cloverleaves regularly after passing through the chronograph screens.

Cm's ballistic coefficients are much higher than Super's. The 165 grain .401 gives .116 BC, while the 160-grain .38's is .113 BC. Centimeter's 1075 fps muzzle velocity has fallen only to 985 fps at 50 yards. Zeroed at 50 yrds, MRT is 1.1 inches. Another way to say it is to note that Super's 50-yard drop is 3.7" to Cm's 3.8", practically identical at MRT. The Super's remaining velocity is 1100 to Cm's 985 fps. In the real world, Cm would have a higher Hatcher RSP at any range. In the IPSC world, Cm is simply a more efficient, accurate device to deliver gamesmanship power levels, with less alteration to its original system.

The Centimeter is demonstrably more efficient for IPSC, and for any handgun use reminiscent of IPSC demands. It is a tough, straight walled round that operates at unusually moderate stresses for what it delivers. To the best of this designer's knowledge, its envelope adapts it to the largest number of service-type auto loading pistols possible.

Long-term study of the Centimeter led the author to develop a series of chamberings based upon Cm's unique efficiency and flexibility. This resulted in a novel cartridge/ chambering system for which initial patent papers were forwarded to the Commissioner of Patents early in 1987. At the same time, Pistol Dynamics prepared a set of patent models covering this entire system, preparatory to the Commissioner's evaluation.

The current IPSC version of the Cm is a portion of this new system, which is exclusively offered through Pistol Dynamics. Centimeter proprietary technology is available only from Paul Liebenberg's firm.

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Whether the Centimeter will sweep the IPSC/Action Match world remains to be seen. If it does, it will be that hoped-for next benchmark in the competition auto environment. If not, it won't be because it didn't have everything needed to win.

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