Terminal performance of the

Barnes 275gr XPB

Fired from a 500 Smith and Wesson magnum revolver

into 10% ballistic gelatin blocks

Brass Fetcher Ballistic Testing

08 March 2011

	Shot 1	Shot 2	Shot 3
Calibration depth (Inches, corrected to 590 ft/sec impact velocity) (Ideal gelatin block penetration depth = 3.4”)	3.6	3.4	3.6
Impact velocity (Measured at 7ft) (ft/sec)	1237	1626	2019
Deepest Penetration Depth (inch)	14.8	18.3	19.5

Notes :

Weapon – Smith and Wesson *500* revolver (.500S&W Magnum); with 8.4” barrel length

Load # Barnes 275gr XPB copper hollowpoint (0.500” diameter)

Distance – 10 feet from muzzle

Introduction

The 500 Smith and Wesson Magnum cartridge is a magnum handgun cartridge designed for hunting revolvers. With a maximum kinetic energy of 2800 ft-lbf, this cartridge approaches the terminal performance of a standard pressure 12 gauge shotgun slug – fired from a handgun with an 8" barrel length. Although intended for hunting and self-defense against bears, there is no question that this cartridge (using expanding or fragmenting ammunition) would also be very successful for protection against hostile humans.

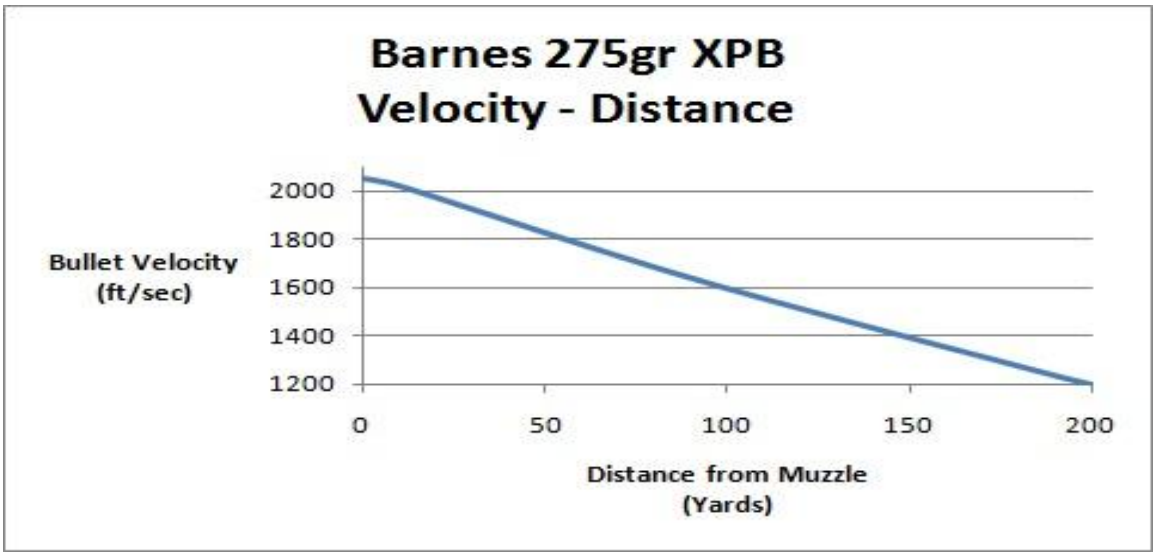
This is a very powerful handgun, and it must be re-stated that you don't gain something without 'losing' something else: weapons chambered for this cartridge are significantly heavier than the 'typical' concealed carry handgun, and feature larger-than-normal muzzle blast and weapon recoil. Much practice is needed in order to become proficient with the typical 500S&W handgun.

Raw Data

Shot number	Block calibration velocity (ft/sec)	Block calibration depth (inch)	Block calibration temperature (degrees Fahrenheit)	Gelatin block core temperature (degrees Fahrenheit)	Impact velocity (ft/sec)	Frontal Surface Area ($inch^2$)	Deepest penetration depth (inch)	Largest crack diameter (inch)	Largest crack diameter location (inch)	Non-cavitation depth (inch)	Projectile Recovered weight (grain)
1	576	3.5	39.0	40.2	1237	0.628	14.8	3.6	4.1	13.2	275.2
2	576	3.0	37.1	37.1	1626	0.545	18.3	5.7	7.1	15.0	274.8
3	581	3.6	41.9	41.0	2019	0.467	19.5	7.1	5.9	19.5	241.4

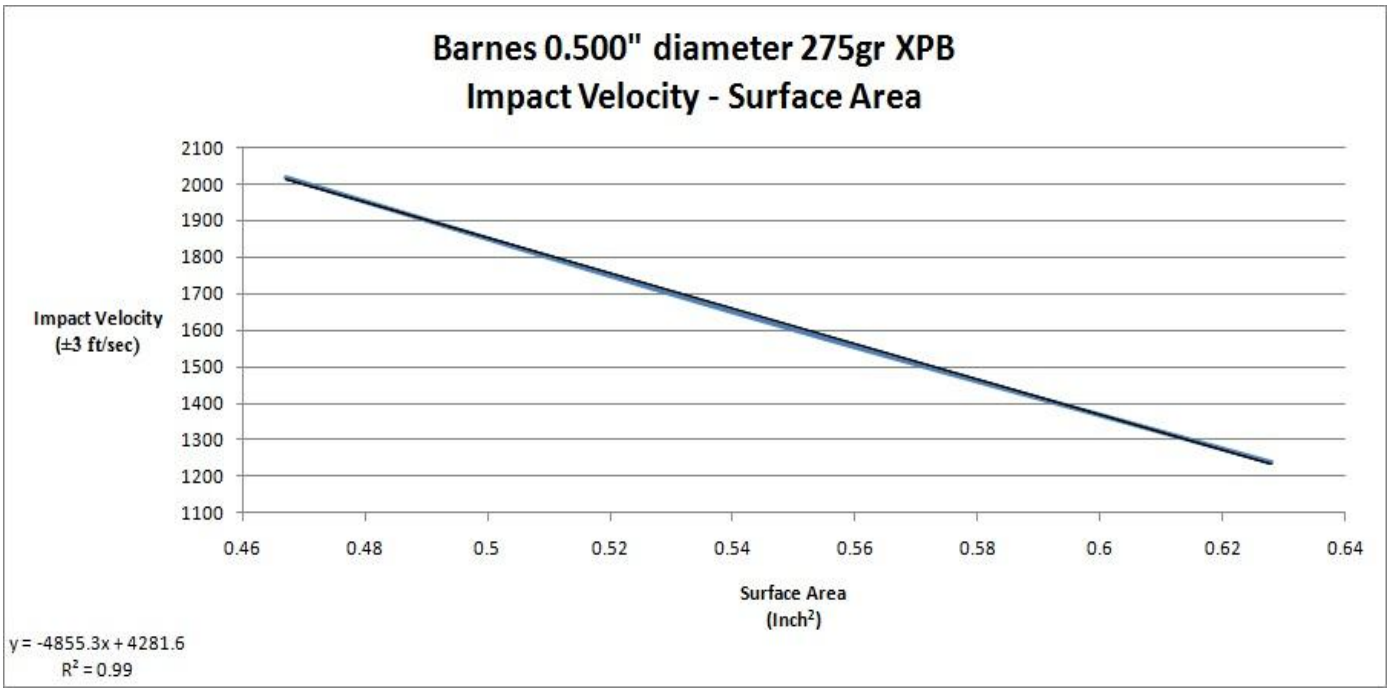
Results

Figure 1. Bullet velocity versus distance from muzzle for the Barnes 275gr XPB



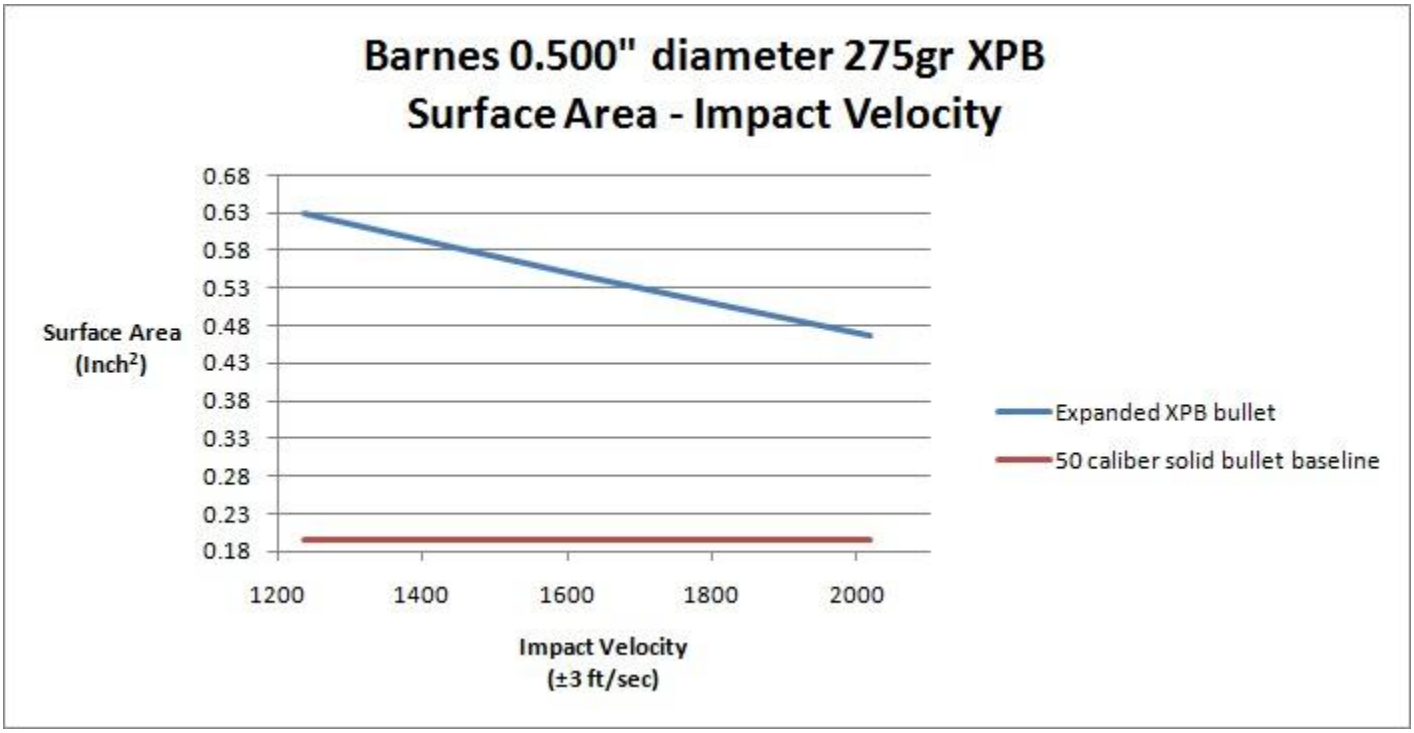
We can see from Figure 1 that the Barnes 275gr XPB bullet is best suited for short range usage as it loses roughly forty-percent of its initial velocity over a distance of 200 yards. Shot 3 illustrates that an impact at 200 yards is still quite effective and well within the bullets designed operating range. However, it must be noted that an impact at 200 yards will bring the projectile into the range of 930 ft-lbf of kinetic energy – somewhat more kinetic energy than a hot 10mm Auto handgun at the muzzle.

Figure 2. Bullet Impact Velocity versus Expanded Surface Area



In order to get a sense of just how much this bullet expanded, we take another look at the graph of Figure 2, this time with an *unexpanded* 500S&W bullet included for perspective:

Figure 3. Bullet Impact Velocity versus Expanded Surface Area, with *unexpanded* baseline bullet



We are very happy with the robustness of this bullets expansion. Even at 200 yards distance, the XPB bullet is fully functional and still effective for medium game hunting and defense against human attackers.

Figure 4. Impact Velocity versus Penetration Depth in 10-percent ballistic gelatin

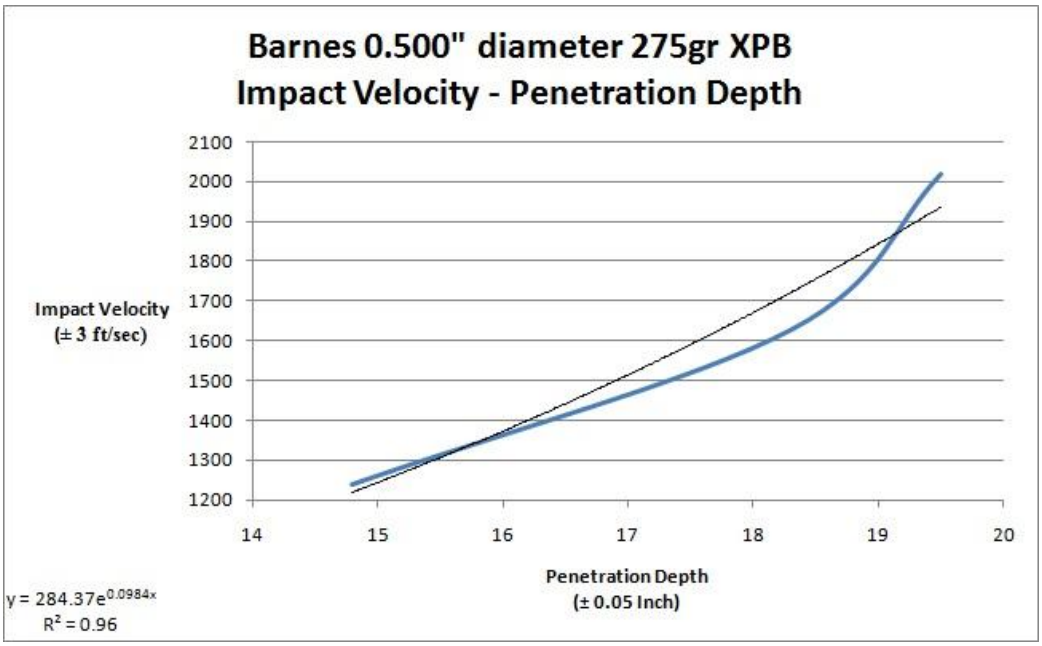


Figure 4 illustrates a fairly linear relationship between impact velocity and penetration depth. As the impact velocity increases, the 'petals' of the hollowpoint fold back and the surface area of the bullet decreases. This usually increases the penetration depth of the bullet. Shot 3 was 'overdriven', in that the impact velocity was higher than the integrity of the bullet construction allowed. Consequently, two of the petals separated from the bullet and cut their own independent tracks through the gelatin block. We view bullet fragments that break off from the main body of the projectile, and cut their own independent tracks through the gelatin, in a favorable light. This fragmentation increases probability of hit, P(h), of a vital structure within the body, even if the main body of the bullet does not follow a path that would intersect with a critical structure.

Figure 5. Side view of **1237 ft/sec** impact

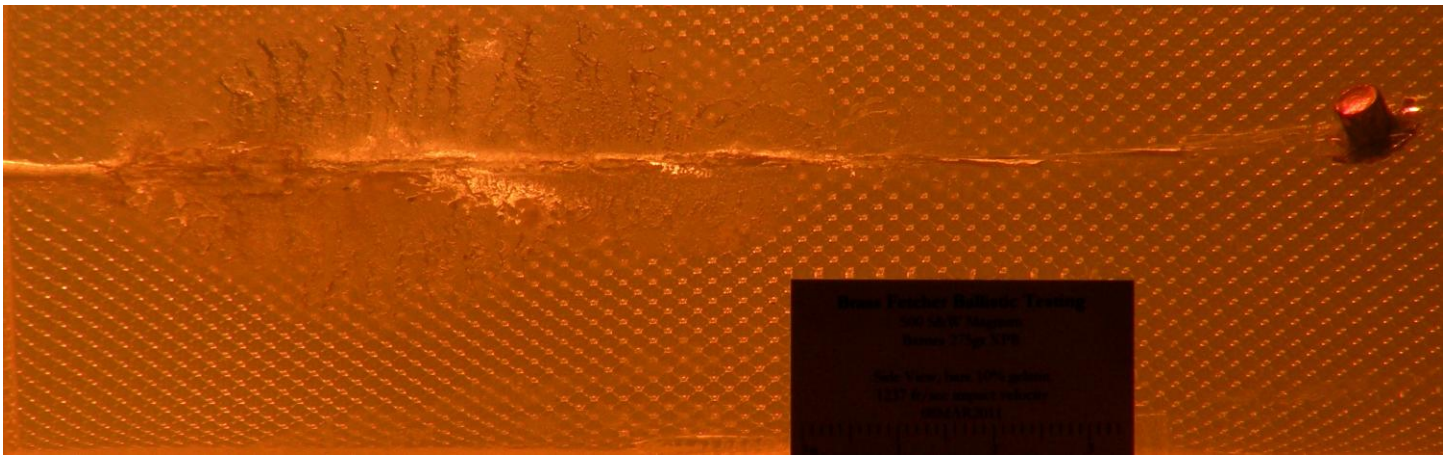


Figure 6. Side view of **2019 ft/sec** impact

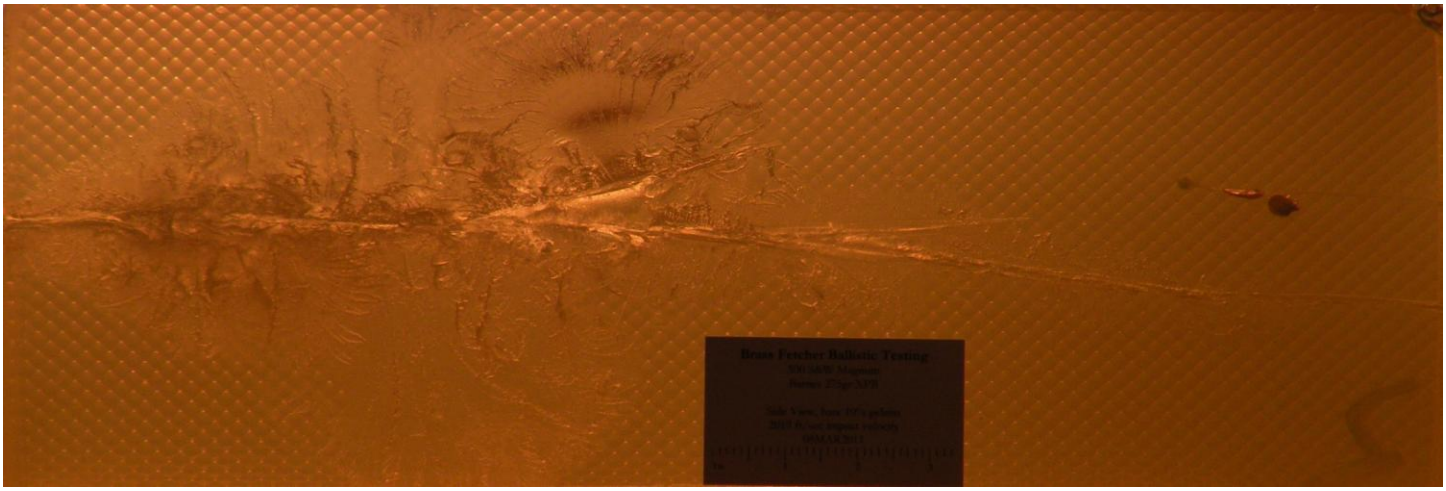


Figure 7. Top View of **1237 ft/sec** impact

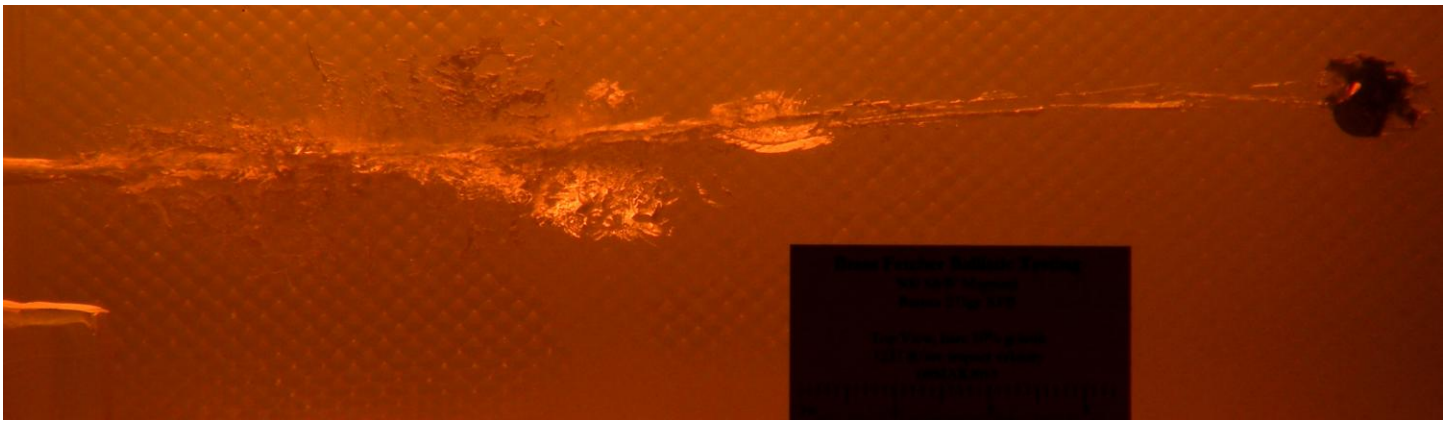
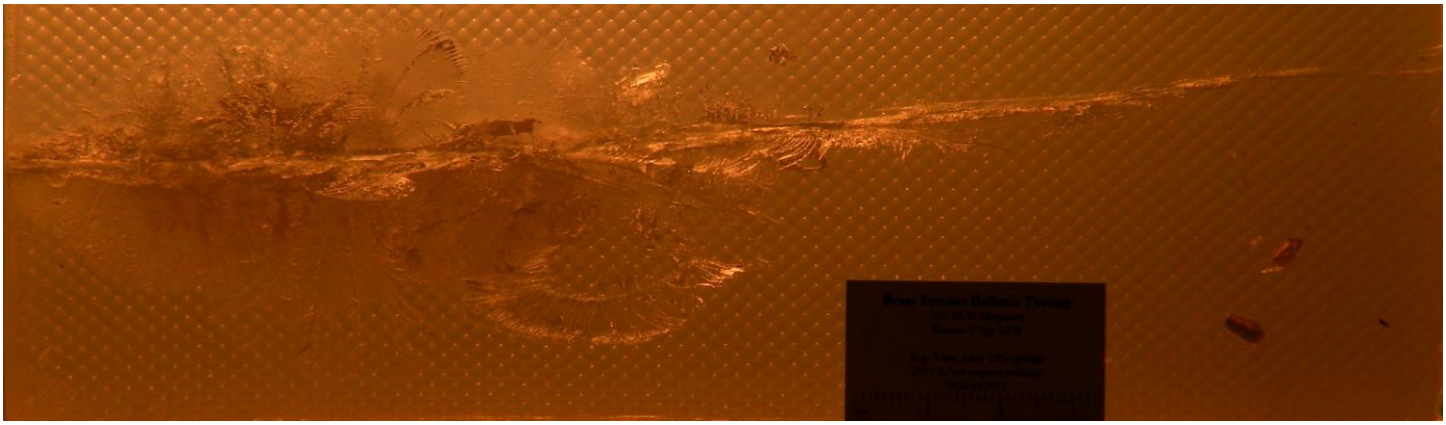


Figure 8. Top View of **2019 ft/sec** impact



The two independent fragments are visible in Figure 8 in the lower right corner. The fragments weighed 16.4gr and 17.0gr and broke away from the main penetration track at 6.5” depth and 13.1” depth, respectively. Given the distance traveled by the fragments in gelatin, it is reasonable to note that they retained enough kinetic energy to deliver disabling hits to vital structures within the body.

Figure 9. Fragment view of **1237 ft/sec** impact

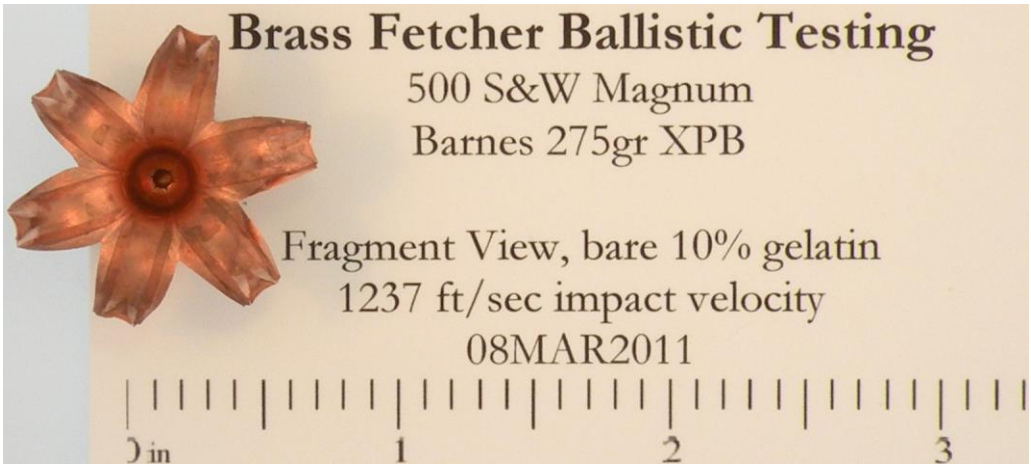
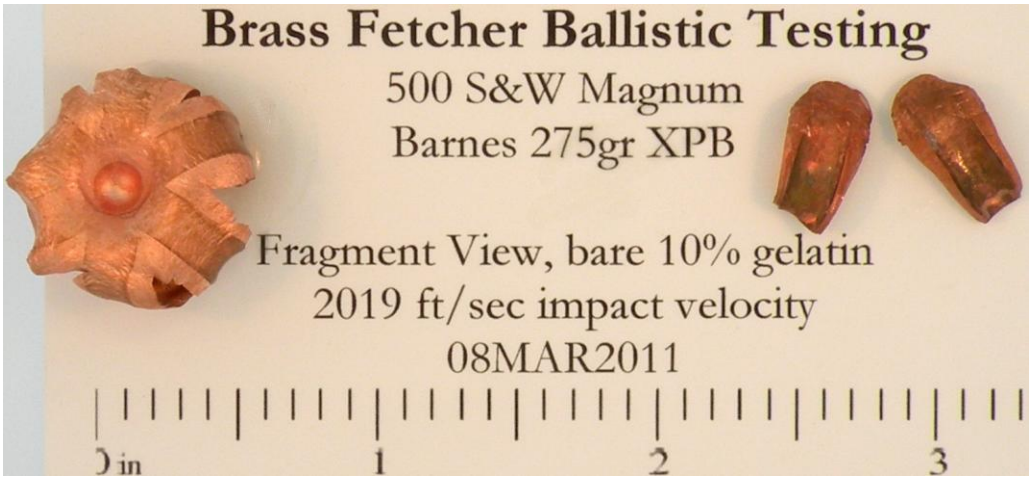


Figure 10. Fragment view of **2019 ft/sec** impact



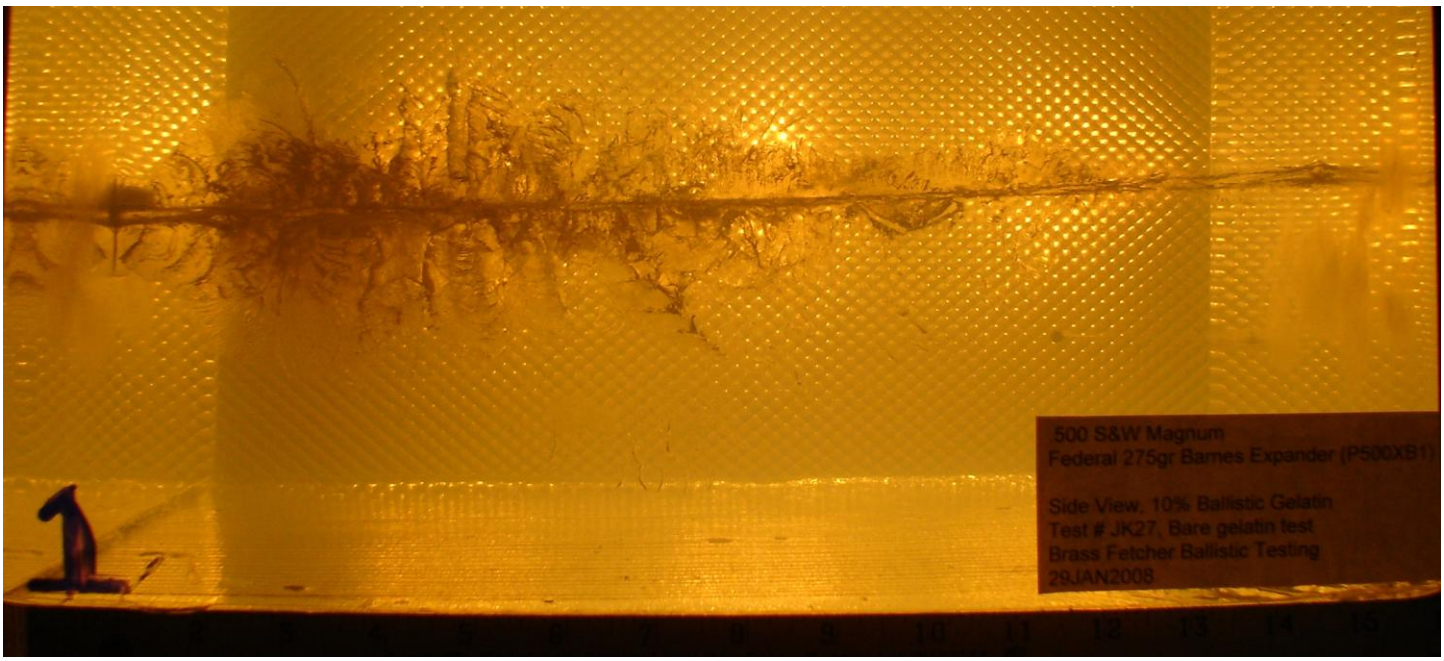
Conclusion

We feel that the Barnes 275gr XPB bullet, as loaded in the 500S&W cartridge, is a very robust design that offers excellent soft target penetration and considerable kinetic energy transfer. More optimized for hunting medium to large game animals, this particular bullet is quite useable for self-defense against bipedal animals as well – especially as it is currently loaded by Cor-Bon as part of their 500S&W Special line. This 'low velocity' loading will produce effects similar to that witnessed in Shot 1, and the lower recoil offers up the possibility of utilizing the cartridge in a lighter, more practically-sized defensive weapon than the 500S&W revolvers made expressly for hunting game animals.

Appendix

Legacy data

L1. Side View of **1626 ft/sec** impact



L2. Top View of **1626 ft/sec** impact

L3. Fragment View of **1626 ft/sec** impact