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Terminal Bullet Performance Login/Join

michael458
One of Us

posted 02 March 2010 16:17 Hide Post

I spent a good portion of my day yesterday measuring bullets! My eyes nearly went hazy with all that strain, even with my glasses and a loop!

I stamped all the bullets I have and have tested to this point. I stamped each bullet's meplat twice, I measured both stamps carefully under the loop and did the absolute best I could with it. Sharper edges on the meplat gave close measurements to what I have done in the past with them, more rounded edges showed less than what I had measured in the past. Mostly I just got the measurements done, and all recorded along with % of meplat for caliber length of bullet, bearing surface, % of bearing surface, Sd, actual diameter, and then test results of that bullet. All this for just the solids I have tested recently and in past years. I have not had time to analyze any of that, but I feel that my rules of thumb for meplat size and stability are going to drop a few percentage points because of it. I do think for sure the ink stamp of meplats is the way to measure them, far more precise than trying to eyeball it, or it is for me. It may not be exact, but I think it is much closer, and I also think it will be more consistent.

I sent a copy to Jim for him to look over. I will try and see if we can post it this week. I also need to send a copy to RIP for him to look over too.

Michael

http://www.b-mriflesandcartridges.com/default.html

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Live Outside The Box of "Conventional Wisdom"

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

jwp475
One of Us

posted 02 March 2010 16:17 Hide Post

Have the Nosler solids been tested?

_____

A 9mm may expand to a larger diameter, but a 45 ain't going to shrink

Men occasionally stumble over the truth, but most of them pick themselves up and hurry off as if nothing had happened.
- Winston Churchill

Posts: **5077** | Location: **USA** | Registered: **11 March 2005**

michael458
One of Us

posted 02 March 2010 16:27 Hide Post

quote:

> Originally posted by jwp475:
> Have the Nosler solids been tested?

JWP

Well, 465HH was kind to send a few samples of the 500 gr 458 Noslers and I tested both in the wet print medium and I think the T'Rex box. This bullet did very good in the 458 Lott. Page 15 for the wet print test, then the T'Rex test is somewhere past that. I would deem it an excellent bullet!

Michael

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

accit
One of Us

posted 02 March 2010 17:19 Hide Post

quote:

> Originally posted by Mafunyane:
>
> quote:
>
> > Originally posted by accit:
> >
> > quote:
> >
> > > Originally posted by Mafunyane:
> > > Your mind is still good.
> > > Was just wondering if .458 standard twist can stabilise such a long bullet.
> > >
> > > I would not change the weight I'm using now.450 gr in win mag is tops.
> >
> > What 450gr do you use?
> > Load and speed ?
>
> Barns bandid solid + triple x and 72gr. s321 for 2200fp/s

Thanks for the info, I'll be trying 400gr HV and 450 FN GSC in 458WM. Will let you know the results once loads are developed.

Posts: **42** | Location: **RSA, Pretoria** | Registered: **14 October 2008**

Rusty
One of Us

posted 02 March 2010 21:36 — Hide Post

So, bullet spin is more of a factor in penetration than bullet length?

Rusty
We Band of Brothers!
DRSS, NRA & SCI Life Member
"I am rejoiced at my fate. Do not be uneasy about me, for I am with my friends."
----- David Crockett in his last letter (to his children), January 9th, 1836
"I will never forsake Texas and her cause. I am her son." ----- Jose Antonio Navarro, from Mexican Prison in 1841
"for I have sworn upon the altar of god eternal hostility against every form of tyranny over the mind of man." Thomas Jefferson
Declaration of Arbroath April 6, 1320-". . .It is not for glory, nor riches, nor honours that we are fighting, but for freedom - for that alone, which no honest man gives up but with life itself."

Posts: **9797** | Location: **Missouri City, Texas** | Registered: **21 June 2000**

michael458
One of Us

posted 02 March 2010 21:49 — Hide Post

Rusty

It's a continuing study. Factors are, Nose Profile, % of meplat for caliber with the flat nose solids, or simply meplat size, twist rate, velocity, and construction of the bullet.

In my opinion so far Nose Profile is at the top of the list, followed by meplat size, twist gets seriously involved when the % of meplat for caliber drops below a point, right now I am looking at less than 60% meplat for caliber as being crucial and twist rate being extremely important at that point, and of course LENGTH is a factor of twist rate, construction, mono or otherwise, higher velocity can increase penetration of most solids, and can also assist in stabilization during terminal penetration. So you see, it's not so simple, and there are a lot of factors to consider because ALL FMJ OR SOLIDS ARE NOT CREATED EQUAL!

This help a little?

Michael

http://www.b-mriflesandcartridges.com/default.html

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

RIP
one of us

posted 02 March 2010 22:08 — Hide Post

I agree with Doc M.
Nose shape is most important.
I shot 1:10" twist 470 Capstick with both short and long RN solids of 500 gr, Woodleigh FMJ and Barnes RN brass long-ones.
Both were equally bad, exiting the side ribs of the IWBB at about half the distance that the GSC FN and North Fork FP of same weight (and intermediate length) would travel straight and true.
All the above at about 2300 fps impact velocity.

My 1:20" Merkel 470 NE at 2100 fps MV impacting at 25 yards, performed the same.
FN and FP straight.
All RNs go squirrelly.

Shoulder stabilization by the large meplat is more significant than twist.
Twist does add some depth by gyro stability in the cavity.

Longer bullet and increased velocity: increased momentum is the motive force to be steered,
but the longer bullets are harder to steer, and resistance goes up with velocity in reactive media.

It is a balancing act.
Right combination of all factors is needed for optimum penetration.

Posts: **28032** | Location: **KY** | Registered: **09 December 2001**

someoldguy
One of Us

posted 03 March 2010 00:00 — Hide Post

> quote:
> So, bullet spin is more of a factor in penetration than bullet length?

What RIP said. (Oops, I originally said "Michael" when it should have been RIP.)

> quote:
> Longer bullet and increased velocity: increased momentum is the motive force to be steered,
> but the longer bullets are harder to steer, and resistance goes up with velocity in reactive media.

Newton had the idea of projectile length having a bearing on penetration depth. Unfortunately, this isn't being borne out by the testing.

_____

Glenn

Posts: **942** | Location: **Alabama** | Registered: **16 July 2007**

capoward
One of Us

posted 03 March 2010 00:52 — Hide Post

> quote:
> Originally posted by someoldguy:
>
> > quote:
> > Longer bullet and increased velocity: increased momentum is the motive force to be steered,
> > but the longer bullets are harder to steer, and resistance goes up with velocity in reactive media.
>
> Newton had the idea of projectile length having a bearing on penetration depth. Unfortunately, this isn't being borne out by the testing.

Except perhaps by those darn 320gr .366 caliber Woodleigh RN bullets!

Jim
"Life's hard; it's harder if you're stupid"
John Wayne

Posts: **4954** | Location: **Central Texas** | Registered: **15 September 2007**

someoldguy
One of Us

posted 03 March 2010 00:57 — Hide Post

> quote:
> Except perhaps by those darn 320gr .366 caliber Woodleigh RN bullets! popcorn

OK, OK. This isn't *always* being borne out by the testing.

Can I have some of that popcorn please?

_____

Glenn

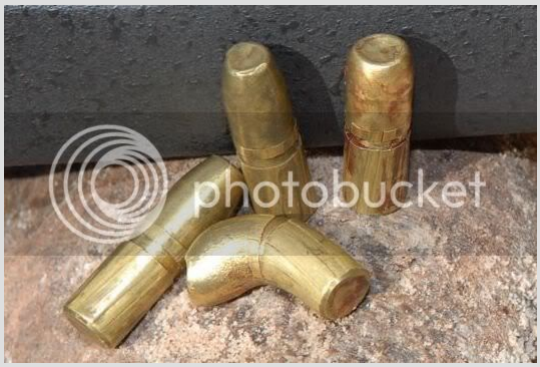
Posts: **942** | Location: **Alabama** | Registered: **16 July 2007**

465H&H
One of Us

posted 03 March 2010 02:05 Hide Post

I know of only one person that has used the new Nosler solid on elephant. He had one bend nearly in half on an elephant skull and two more that bent slightly, all at the cannalure. In some ways, an elephants head may be tougher than the media currently in use. Since such bending has not been seen by Michael.

465H&H

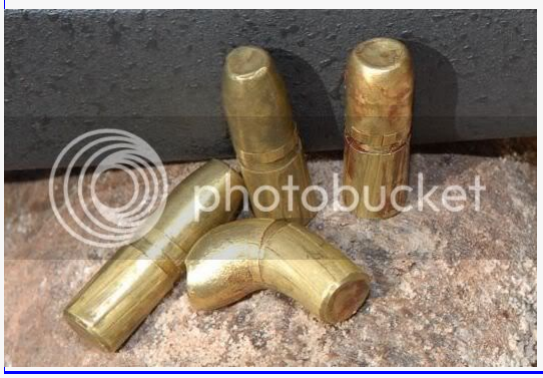


Posts: **5686** | Location: **Nampa, Idaho** | Registered: **10 February 2005**

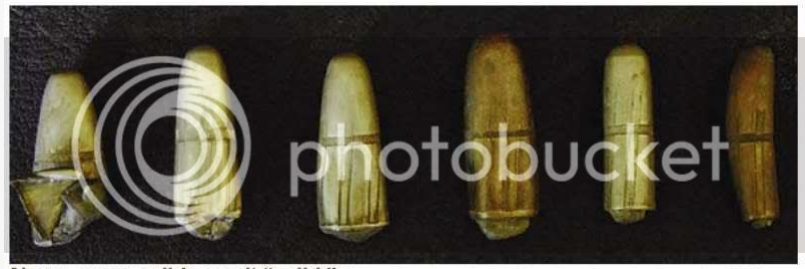
capoward
One of Us

posted 03 March 2010 03:25 Hide Post

quote:

> Originally posted by 465H&H:
> I know of only one person that has used the new Nosler solid on elephant. He had one bend nearly in half on an elephant skull and two more that bent slightly, all at the cannalure. In some ways, an elephants head may be tougher than the media currently in use. Since such bending has not been seen by Michael.
>
> 465H&H
>
> 
>

I'd read on another forum that the Nosler mono solids had bent on use. Also looks like they never intended them to be used with a DR either which is a marketing mistake. But then perhaps not if they're prone to bending like some of the old C&C FMJ's. Here's a photo I keep around to remind me of the importance of proper bullet construction:



Above, some solids aren't "solid." (Extract from Page 79, Rifle Magazine, November-December 2009)

Oh yes, thank you for correcting me with the assumption of expanding and solid in DR for elephant. I re-read the article and it did relate to buffalo.

Jim
"Life's hard; it's harder if you're stupid"
John Wayne

Posts: **4954** | Location: **Central Texas** | Registered: **15 September 2007**

Rusty
One of Us

posted 03 March 2010 03:47 Hide Post

Thank you all for your insight. I had always heard that a longer bullet aided in penetration.
If my memory serves my correctly a .416-Anything penetrates well? Nice long 400 grain bullets. I've had good luck with my .408 400 grain bullets at modest velocity doing well.

I am not a ballistics expert, just my observations over the years.

Thanks again!

Rusty
We Band of Brothers!
DRSS, NRA & SCI Life Member
"I am rejoiced at my fate. Do not be uneasy about me, for I am with my friends."
----- David Crockett in his last letter (to his children), January 9th, 1836
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"for I have sworn upon the altar of god eternal hostility against every form of tyranny over the mind of man." Thomas Jefferson
Declaration of Arbroath April 6, 1320-". . .It is not for glory, nor riches, nor honours that we are fighting, but for freedom - for that alone, which no honest man gives up but with life itself."

Posts: **9797** | Location: **Missouri City, Texas** | Registered: **21 June 2000**

capoward
One of Us

posted 03 March 2010 07:47 — Hide Post

quote:

> Originally posted by Rusty:
> Thank you all for your insight. I had always heard that a longer bullet aided in penetration.
> If my memory serves my correctly a .416-Anything penetrates well? Nice long 400 grain bullets. I've had good luck with my .408 400 grain bullets at modest velocity doing well.
>
> I am not a ballistics expert, just my observations over the years.
>
> Thanks again!

Rusty,

I've read that the Rigby proprietary copper-clad steel-jacketed lead-core RN FMJ bullets in 310gr .358 caliber (1.443") in .400/.350 Nitro Express, the 400gr .408 caliber (1.412") .450/.400 3" Nitro Express, and in 410gr .416 caliber (1.399") .416 Rigby were the most durable and deepest penetrating of all solids in the early 20th century with the .408 being the deepest driving of the three.

Woodleigh has done a great job of replicating bullets for the early 20th century cartridges but they may not have fully replicated the early Rigby proprietary bullets.

As an FYI, I conversed with North Fork last year and was informed that they do manufacture their CPS and FPS bullets in the .408-.411 calibers but require your bore and groove diameters so they can properly cut the shank and band diameters.

Jim
"Life's hard; it's harder if you're stupid"
John Wayne

Posts: **4954** | Location: **Central Texas** | Registered: **15 September 2007**

someoldguy
One of Us

posted 03 March 2010 09:53 — Hide Post

quote:

> I had always heard that a longer bullet aided in penetration.

This was honestly one of my main assumptions also, until I started hanging out here. I didn't even believe in the effect of spin in penetration. I just assumed that a bullet stopped spinning on impact. But pretty clearly it doesn't stop spinning!

In all fairness to Newton, I don't think his basic formula about length and impact depth covered a fast-spinning projectile. Not that it's the spin that affects the penetration depth, but that it affects the bullet's stability inside the target. And this is what affects penetration. Naturally, if a long bullet turns sideways, then its penetration goes down the tubes.

But I for one am not an expert. I'm just learning along with everyone else. Unless someone already knows everything and is holding out on us.

_____

Glenn

Posts: **942** | Location: **Alabama** | Registered: **16 July 2007**

capoward
One of Us

posted 03 March 2010 11:40 — Hide Post

quote:

> I had always heard that a longer bullet aided in penetration.

Rusty & Glenn,

Perhaps there are some "sweet spot" combination of caliber/length/nose profile characteristics for traditional RN FMJ solid bullet construction that will prove to be both durable and provide full depth straight-line penetration. The 320gr .366 caliber Woodleigh RN FMJ solid has already provided straight-line penetration matching the best FN monometal bullets in Michael's single bullet box mix. But it could be a long process to identify just how many "sweet spot" RN FMJ solid combinations exist and Michael will suffer massive bullet box damage before that quest would be finished.

But some very well designed FN monometal bullets have already been identified that provide much deeper straight-line penetration than equal weight or heavier weight RN FMJ solids, even when fired in twist rates common to Nitro Express caliber twist rates established in the late 19th/early 20th century era.

And we definitely are getting closer to identifying some static bits of FN bullet construction characteristics that will lead to optimum performance especially with monometal construction.

Perhaps when these static FN parameters are solidified, Michael will have to retest the 9.3 caliber using his Mastodon mix with double bullet box depth and pit a properly designed and weight FN monometal against the 320gr Woodleigh RN FMJ solid composition to identify if that "sweet spot" combination of bullet characteristics for RN FMJ solids truly exists and how it truly compares to the modern bullet.

Jim
"Life's hard; it's harder if you're stupid"
John Wayne

Posts: **4954** | Location: **Central Texas** | Registered: **15 September 2007**

michael458
One of Us

posted 03 March 2010 12:30 — Hide Post

Capoward

Yes, I know, have to put a box together again for the 9.3 320 Woodleigh FMJ!!!! Have not forgot, have to put two boxes together!

While doing the measurements of all the bullets Monday, I did get out a 320 FMJ and look at the nose under the loop, and while doing so with some of the larger caliber Woodleighs too. There is a vast difference in nose profile of the 9.3 and the larger caliber bullets. It is a rounded/flat design, can be seen under good magnification pretty well. In fact there is a distinct line that can be seen in the metal which appears would be the surface area that would drive the nose during penetration, it's vastly larger and different than say a 458 500 Woodleigh, which is very rounded and small. The 9.3 is about the same overall length as the 458 500 Woodleigh, a tiny bit longer. I would say in this order, Nose Profile, then possibly caliber and length. The 286 Barnes Banded has a tiny meplat 48% of caliber, and it's terminals are no better than a round nose 458! After 25 inches it does not know where it wants to go? Maybe a 1:9 twist would help the 286 Barnes, but with the 320 doing so well no point in that, unless a fellow had one anyway. I have to test that again as I just looking at my notes that was tested in Corbins 9.3X62 rifle, and I don't know the twist rate in that old gun??? I have not done it in the known 1:12 in the 9.3 B&M. The 320 was tested in the 9.3 B&M and 1:12.

Several years ago I tested the .358 310 Woodleighs FMJ and at that time it was just straight wet print and a 48 inch box, they whizzed through it easy. Have not tested them in recent years. They need to be put on the slate to test also.

Michael

http://www.b-mriflesandcartridges.com/default.html

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

Warrior
One of Us

posted 03 March 2010 15:37 — Hide Post

quote:

> I just assumed that a bullet stopped spinning on impact. But pretty clearly it doesn't stop spinning!

Someoldguy,

Agreed, spinning cannot stop abruptly, but how many spins would a bullet in a 10-inch twist and a 14-inch twist complete in an animal of say 30 inches? It is this difference that is under investigation here, not so?

Then obviously on transition of the bullet until it is full emerged, let us call that a distance of 1.5" on average, what would the incremental faster spin be that we would achieve by the 2 spin rates mentioned above?

Warrior

Posts: **2273** | Location: **South of the Zambezi** | Registered: **31 January 2007**

someoldguy
One of Us

posted 03 March 2010 15:49 — Hide Post

quote:

> Perhaps there are some "sweet spot" combination of caliber/length/nose profile characteristics for traditional RN FMJ solid bullet construction that will prove to be both durable and provide full depth straight-line penetration. The 320gr .366 caliber Woodleigh RN FMJ solid has already provided straight-line penetration matching the best FN monometal bullets in Michael's single bullet box mix. But it could be a long process to identify just how many "sweet spot" RN FMJ solid combinations exist and Michael will suffer massive bullet box damage before that quest would be finished.

Yeah, I had forgotten about that 320 grain 9.3 bullet being a roundnose. Darn inconsiderate of it performing like that!

I think what Michael points out here is revealing:

quote:

> While doing the measurements of all the bullets Monday, I did get out a 320 FMJ and look at the nose under the loop, and while doing so with some of the larger caliber Woodleighs too. There is a vast difference in nose profile of the 9.3 and the larger caliber bullets. It is a rounded/flat design, can be seen under good magnification pretty well. In fact there is a distinct line that can be seen in the metal which appears would be the surface area that would drive the nose during penetration, it's vastly larger and different than say a 458 500 Woodleigh, which is very rounded and small. The 9.3 is about the same overall length as the 458 500 Woodleigh, a tiny bit longer.

Since this is a pretty complicated subject, it's easy for me to overlook quite a few things. One thing I overlooked about the 9.3 bullet is its obvious smaller surface area. We already know generally that the smaller the penetrating surface area, the deeper the penetration (as long as the bullet holds its shape and doesn't go unstable.)
Might a smaller caliber bullet like a 9.3 stabilize more easily with a smaller percentage meplat than a big bore? Of course, I don't have an answer, but I think it's something to think about.
I think I have this much halfway figured out:
If we consider that a roundnose bullet's surface area is like a hemisphere (half a sphere), then we know that the surface area can be easily found: 2 x pi x radius, squared. For a .458 inch bullet, the surface area is then 0.329 square inches. Now since a meplat's surface area is flat, then its surface area is going to be like the top of a cylinder. It turns out that the surface area of a flat point is going to be based on the meplat's radius, not the bullet's radius because the meplat is the area which makes contact with the target. If the meplat of a .458 bullet is .31 inches, then the surface area presented to the target is only about 0.075 square inches.

I hope this makes sense. It doesn't to me, but then I have insomnia.

_____

Glenn

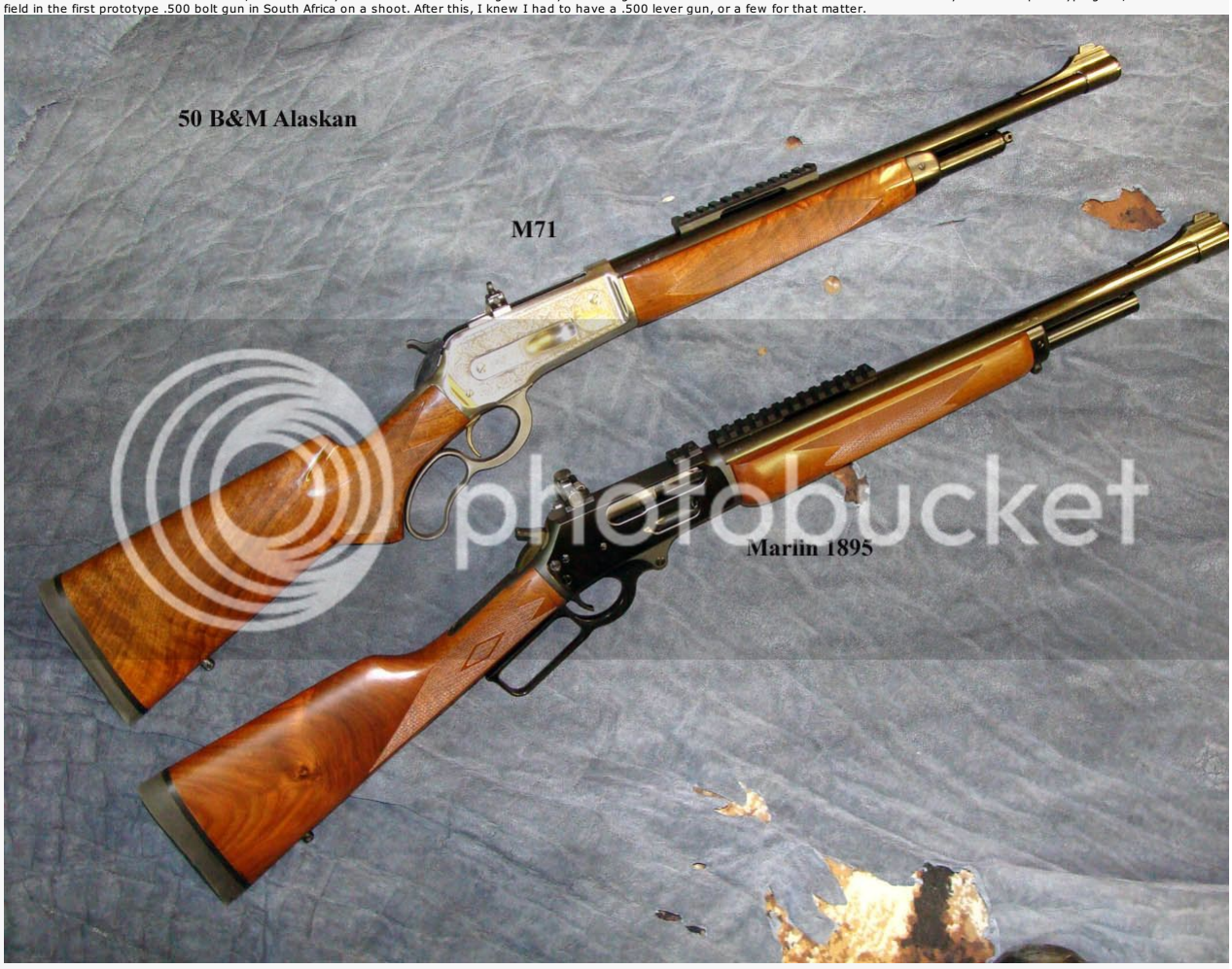
Posts: **942** | Location: **Alabama** | Registered: **16 July 2007**

michael458
One of Us

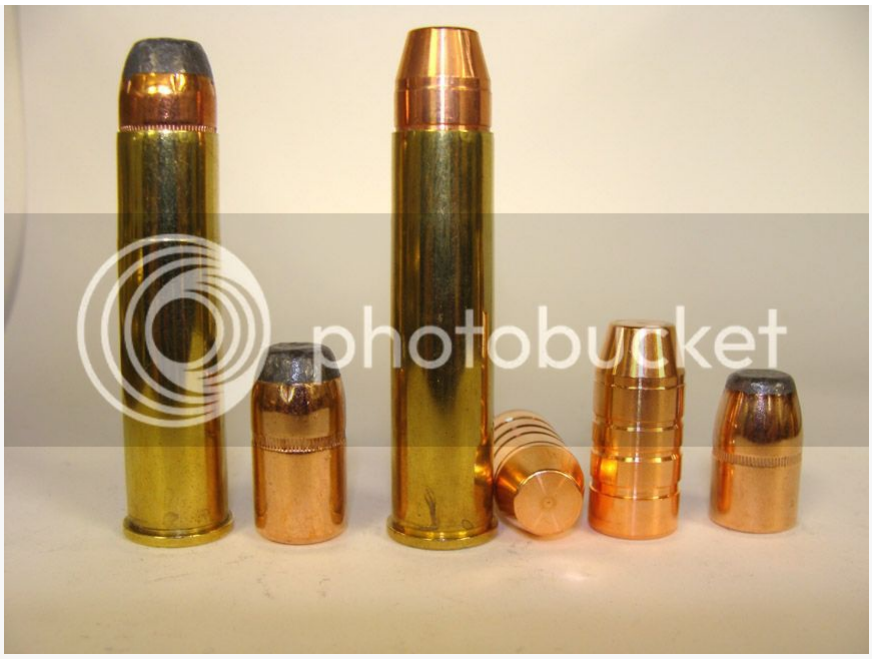
posted 03 March 2010 20:38 — Hid

Well I hated to leave you guys with no bullets to look at this week, so since I have some medium left, I decided to chew some up today, and chew it did!

I love my lever actions too, but they have taken a back seat for a few years while I sort my bolt guns out. As some know, I take a 50 Alaskan case, squeeze it down to .500 caliber, and put it in either a M71 or a Marlin 1895. When I did this, I had basically two bullets in mind, 500 gr Hornady and 400 gr Sierra. Both of which were tested rather extensively in the first prototype guns, and then in the field in the first prototype .500 bolt gun in South Africa on a shoot. After this, I knew I had to have a .500 lever gun, or a few for that matter.



Today I did an update test of 3 bullets fired from the M71 you see above, 500 Hornady, 455 JDJ Solid, and 400 Sierra.



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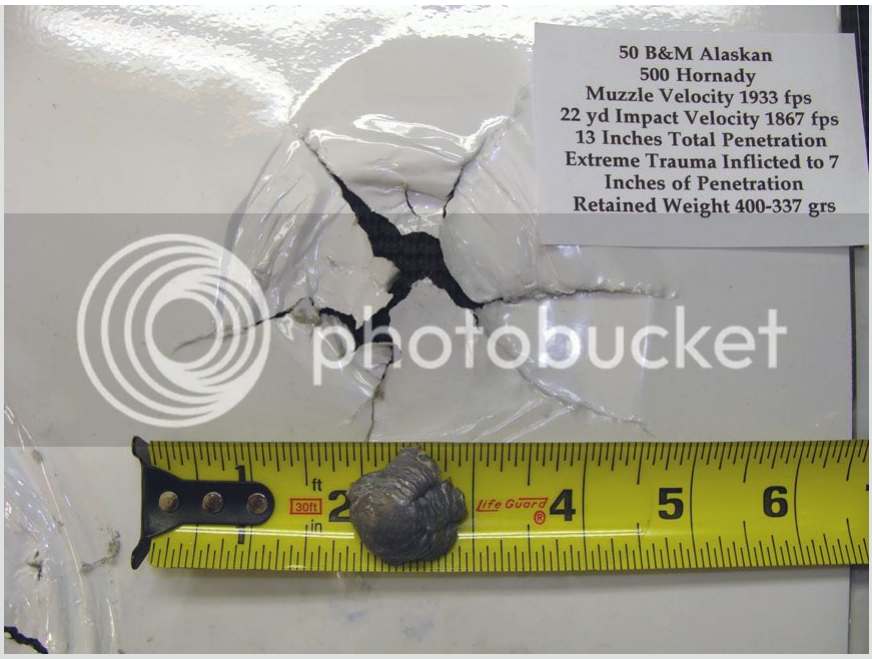
Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

michael458
One of Us

posted 03 March 2010 20:55 Hide Post

We will start off with the 500 gr Hornady. This bullet is a hammer, and it's perfect for the lever guns with it's big exposed flat lead meplat. Of course you know this bullet was designed originally for the 500 S&W at 1200 fps or so. Well I started testing it from 1400 fps to 2100 fps and found out that it hit hard, jacket and core stayed together so I have been using it in the single shots and levers since 2006. I took it to South Africa early in 2006 for a test and was running it at the time 1875 fps in the NOW current 50 B&M SA (Semi Auto), at the time it was in a prototype bolt gun. I shot wildebeast and zebra with it from 20 yds to 100 yds and it hammered them to the ground on the spot. I shot one giraffe with it and the giraffe managed 10 yds and fell over. Wounded (my fault) an eland, and eland are tough, gut shot, but he could not take that bullet too far before laying up, we caught up to him and sorted it out. So it is proven in the tests and in the field. I figure this load, this bullet, this rifle will handle any thin skinned game on the planet, including the bears and lions! We were going to take it to Russia for bear last year, but that fell through a couple of days before leaving. So I have yet to take my 50 B&M Alaskans out yet, too busy with the various bolt guns. Eventually I will get to it!

There was a tremendous amount of trauma inflicted upon the medium. From impact it flung wet print 20 feet in all directions, a rare thing that I don't see often. Where these two bullets traveled, that was the end of the print there was 4-5 inch holes across, 2 is all you could shoot, then dump it from the box. This is a photo of the 4 Inch Witness Card! If you look back in past pages, I think you will get a feel for it. The only one I have that shows equal trauma is the 470 Copper HP I use in the 50 and 500 MDM, and from the MDM at 2400 fps. At least that I can recall off the top of my head.



Penetration comes a little short for me to call it a buffalo bullet however. While it probably would do, I would rather have a little more penetration to be honest for buffalo. Of course a giraffe is not exactly a small thin skinned critter either? It hammered a giraffe! The last giraffe I shot was with a Marlin and 45/70 460 Cast Performance at 1750 fps, it was a running gun battle and I shot all 4 rounds I had while this thing was running around back and forth in front of me! Fortunately the 4th round he finally gave up, good thing, that's all the ammo I had! I did not realize it was going to be a battle! The 500 Hornady put the other one down in 10 steps, I was impressed with that myself.

Michael

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

Gerard
one of us

posted 03 March 2010 20:55 Hide Post

> quote:
>
> Agreed, spinning cannot stop abruptly, but how many spins would a bullet in a 10-inch twist and a 14-inch twist complete in an animal of say 30 inches? It is this difference that is under investigation here, not so?

No, it is not what is being investigated. Eleven times now? "This is not what we are saying. You are right. Rotational velocity cannot work in this context. Agreed. Yes. No argument on this. Yes. Yes. Yes."

BTW. Your little tome on Munk is quite entertaining.

> quote:
>
> Munk took the Bavis-McCoy model just a bit further

Don't think so, McCoy was stil at BRL in the late eighties when Munk would have been approaching an age of 100.

Anyone know what Munk did after NACA and how old he actually got?

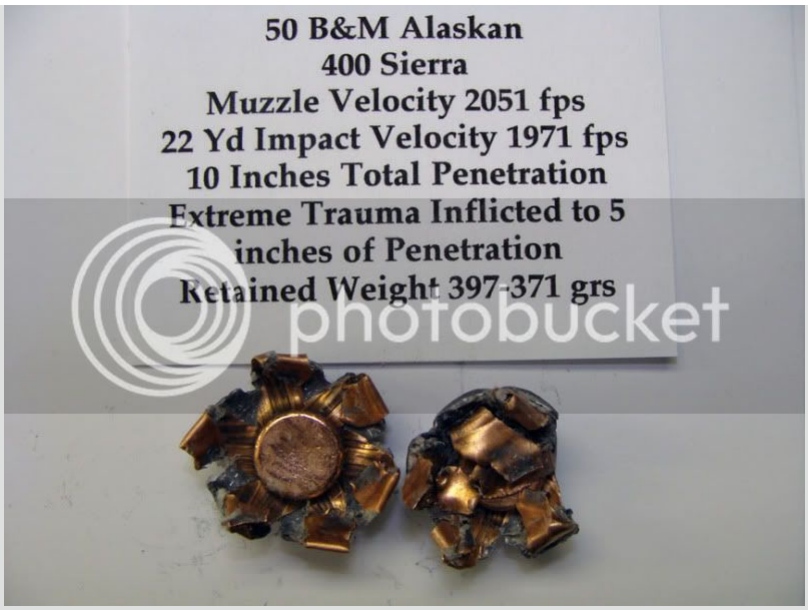
Posts: **2848** | Registered: **12 August 2002**

michael458
One of Us

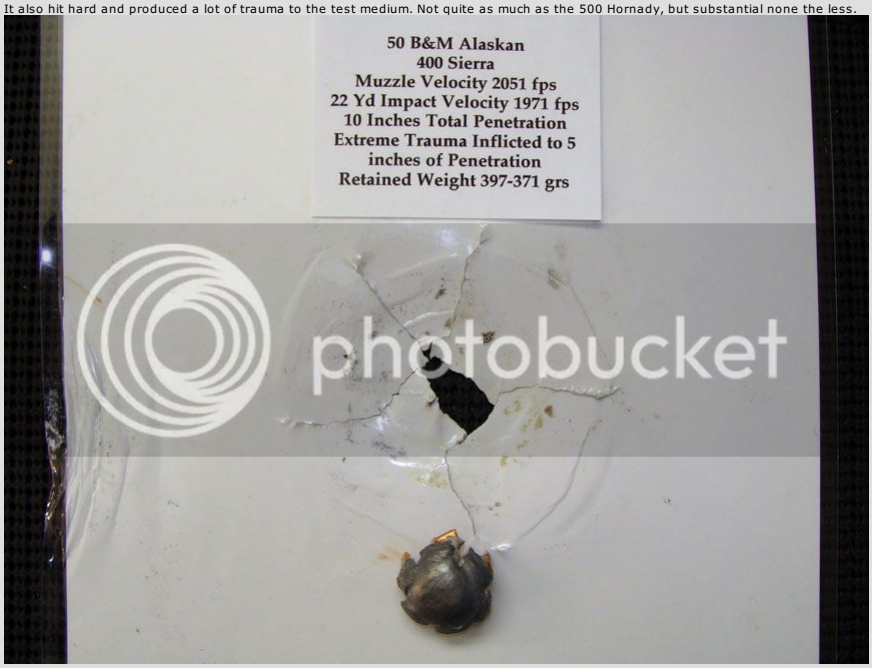
posted 03 March 2010 21:01 Hide Post

Next while doing expanding bullets let's cover the 400 Sierra. Never been much of a Sierra fan, but they got this one right! This is the most accurate FACTORY MANUFACTURED bullet I have ever used in any of or all the .500 rifles I shoot. It is at least equal to our CNC bullets. An excellent bullet for the lever guns too, nice flat lead meplat. I also used this bullet in 2006 on a couple of critters, wildebeast being one of them, and it's a hammer too, hits hard, holds together well up to velocities of 2100 fps from the muzzle. Go much beyond that and the jacket/core will begin to separate, which I did not expect the bullet to make it to that velocity much less beyond.

Extreme expansion as you can see, but still held together at impact velocity just under 2000 fps.



It also hit hard and produced a lot of trauma to the test medium. Not quite as much as the 500 Hornady, but substantial none the less.



http://www.b-mriflesandcartridges.com/default.html

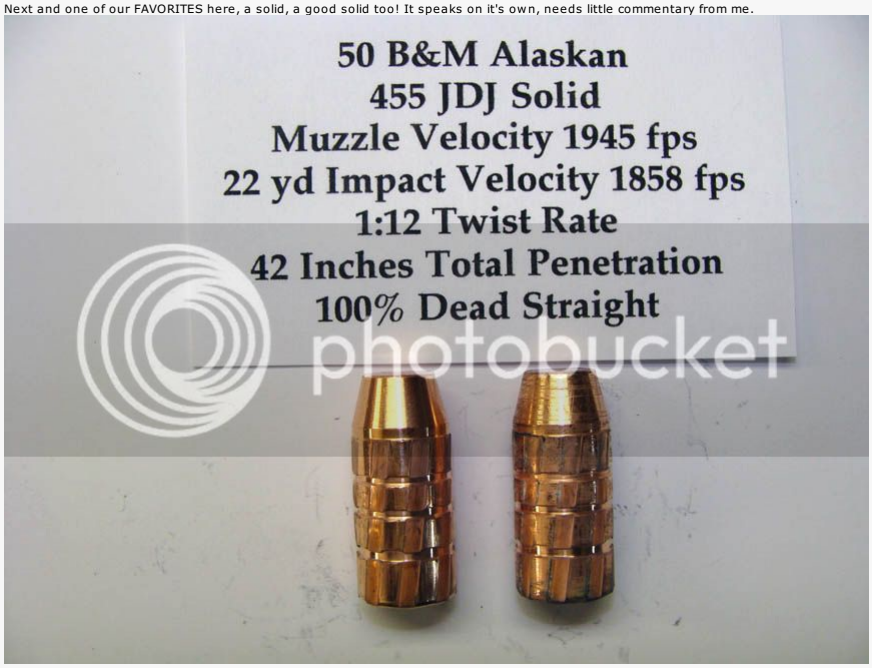
The New Word is "Non-Conventional", add "Conventional" to the Endangered Species List!
Live Outside The Box of "Conventional Wisdom"

Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

michael458
One of Us

posted 03 March 2010 21:06 Hide Post

Next and one of our FAVORITES here, a solid, a good solid too! It speaks on it's own, needs little commentary from me.



Lever guns, gotta love them eh? Fast too, easy to carry, and in .500 caliber, nice hammers!

Michael

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

michael458
One of Us

posted 03 March 2010 21:10 Hide Post

Hi Gerard

Had an excellent test the other day with your 416 caliber 330 gr GSC HV!!!! Did you see? It was one of the tests done this past Saturday I think.

I tested it in one of my 416 B&Ms at around 2500 fps, more velocity would have given more penetration, but is was very good regardless, I would not hesitate to work with such a bullet, good job!

Michael

http://www.b-mriflesandcartridges.com/default.html

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

Warrior
One of Us

posted 03 March 2010 22:29 — Hide Post

> quote:
>
> Then obviously on transition of the bullet until it is full emerged, let us call that a distance of 1.5" on average, what would the incremental faster spin be that we would achieve by the 2 spin rates mentioned above?

Gerard,

You either missed or ignored the second part of the question on purpose, which is actually the real question.
That is why I stated it categorically and put 1.5 inches on it to accommodate most bullets.
The calculated figure should then give us a better feel or grasp of the magnitude of additional spin, not so?

Warrior

Posts: **2273** | Location: **South of the Zambezi** | Registered: **31 January 2007**

someoldguy
One of Us

posted 03 March 2010 22:31 — Hide Post

> quote:
>
> Well I hated to leave you guys with no bullets to look at this week, so since I have some medium left, I decided to chew some up today, and chew it did!

Thanks for the tests, Michael. You know I'm like a baby without a bottle when I don't have my tests.

It's interesting to get some scoop on the .50 Alaskan. I've heard of it for several years, but I don't know its application.

_____

Glenn

Posts: **942** | Location: **Alabama** | Registered: **16 July 2007**

michael458
One of Us

posted 03 March 2010 23:07 — Hide Post

Glenn
Remember this is 50 B&M ALaskan---not the 50 AK. 50 AK is .510 caliber.
M

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

someoldguy
One of Us

posted 03 March 2010 23:26 — Hide Post

> quote:
>
> Glenn
> Remember this is 50 B&M ALaskan---not the 50 AK. 50 AK is .510 caliber.
> M

Oops! Pardon me.
Well if we have the .50 B&M Alaskan, then we don't need the 50 Alaskan, do we?

_____

Glenn

Posts: **942** | Location: **Alabama** | Registered: **16 July 2007**

michael458
One of Us

posted 04 March 2010 00:15 — Hide Post

Glenn

Correct, I have two 50 AK's I did before I developed or thought of the 50 B&M AK!

Michael

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

capoward
One of Us

posted 04 March 2010 00:32 Hide Post

Gentlemen I'm not trying to be an ass so please don't take it that way.

> quote:
>
> > quote:
> >
> > I just assumed that a bullet stopped spinning on impact. But pretty clearly it doesn't stop spinning!
>
> Agreed, spinning cannot stop abruptly, but how many spins would a bullet in a 10-inch twist and a 14-inch twist complete in an animal of say 30 inches? It is this difference that is under investigation here, not so?

Unfortunately to determine this specific piece of information would require a test medium that is sufficiently clear for photographic work and some extremely expensive high speed camera equipment in the range of thousands of photos per second. While the first might be doable do you know anyone at NASA, Lawrence Laboratories, or another organization with this quality of equipment that would *loan* us the use of their equipment for this purpose.

> quote:
>
> Then obviously on transition of the bullet until it is full emerged, let us call that a distance of 1.5" on average, what would the incremental faster spin be that we would achieve by the 2 spin rates mentioned above?

I'm not sure how many scientist or ballistician types we have conversing on this thread but I do believe most of this aspect of the conversation will take place between that small group with the balance of us attempting of muddle our way through it.

Many years ago I read in some studies that a high speed bullet has an airflow envelope in front of the bullet as well as alone side and behind and that the shape of this airflow envelope changes as the style of the bullet changes.

So I now have a question along these lines. Here's the static data…bullet is a 70% meplat FN bullet and here are the questions:
1) At velocity does the nose of bullet impact the mass first vis-à-vis the bullet's airflow envelope?"
2) At what velocity does a bullet's airflow envelope penetrate into the mass sufficiently so that the bullet is within the mass 1.5" without physically touching the mass? And,
3) Is the explosive cavity we see in test media the result of the bullet impacting the test media or the bullet's airflow envelope?

The reason I pose these three questions is because performance of bullets under varying twist rates was not, and still is not the principal focus of this thread…that place is taken by NonCon and FN bullet performance with an intent to identify the specific narrow band of bullet design characteristics that assure they perform as near perfect as possible. NonCons to expand and shear their petals under certain conditions to assure that the bullet shank continues to penetrate the mass to a point somewhere between the penetration of a traditional bonded C&C bullet and a deep driving FN monometal bullet. FN monometal bullets that give extremely deep straight-line performance, far deeper than the *typical*-traditional RN FMJ bullet.

Twist rate has only intruded into this thread after identifying that only a slightly faster twist rate may overcome a less than optimally designed FN solid bullet to provide full straight-line penetration within the test media mass were it previously lost stability within mass. Inversely Mike has adequately demonstrated that a correctly designed FN monometal bullet can provide full straight-line penetration in a twist rate sufficiently slow to not fully stabilize a RN monometal bullet in the test media mass…

So twist rate has been identified as important to bullet straight-line penetration within test media where the bullet is less than optimally designed.

Now for the easy answers to your questions; your question of 10" twist vis-à-vis 14" twist is fairly simple; 3 full revolutions vis-à-vis 2.142857 revolutions. Pretty close but still different. Perhaps a better example would be a 10" twist rate vis-à-vis an 18" twist rate or perhaps a 20" twist rate…here we get 3 full revolutions vis-à-vis 1.6666…revolutions or 1.5 revolutions. Or even better why not throw in the 38" twist rate where we get 0.789473 revolutions in 30 inches of mass or a 60" twist rate with ½ revolution in 30" of mass…

Perhaps another way to look at it is how many revolutions will the following twist rates do in 10" of mass; 1:8" = 1.25 revolutions, 1:10" = 1 revolution, 1:12" = 0.833… revolutions, 1:14" = 0.7142857 revolutions, 1:16" = 0.625 revolutions, 1:18" = 0.555… revolutions, 1:20" = 0.5 revolutions, 1:38" = 0.2631578 revolutions, and 1:60" = 0.1666… revolutions. From this we see that some bullet twist rate combinations have almost no discernible revolutions in 10" of mass.

But we're not discussing the stability of round or conical lead bullets so slow twist rates are inessential to our discussions. Unfortunately many of our DR twist rates were established in the late 19th century as DG hunters moved from black powder lead bullets to smokeless powder and jacketed bullets.

Today we're discussing the performance of indestructible monometal bullets, unless specifically designed for frontal expansion and shearing of petals, using smokeless powders insensitive to temperature extremes. It's a different world today…with a different set of circumstances.

The impact of the bullet's air envelope and barrel twist rate to bullet shape performance into and within dense mass is something left to the scientist and ballistician group. Please give us your best information even if it's a WAG or SWAG as to the best combinations to accomplish the task at hand.

Meanwhile the rest of us will continue to be the popcorn gallery and throw questions and comments at Michael, Mike, and RIP, once his IWBB is back up and running, continue to muddle through multiple tests substantiating what FN bullet shapes work best within our static test media scenario.

Again I apologize to all, no intent to attack anyone or snub any toes. Now out to catch up on yard work. And yes I do not enjoy yard work!

Jim 
"Life's hard; it's harder if you're stupid"
John Wayne

Posts: **4954** | Location: **Central Texas** | Registered: **15 September 2007**

Phatman
One of Us

posted 04 March 2010 03:05 Hide Post

Hello,
As far as the question:
Do the bullets keep spinning after they hit?
Yes they do.
Just go to the Barnes Bullets web site and look at the videos.
When they stop spinning they start to get unstable. You can see that too.

John 

Give me COFFEE and nobody gets hurt

Posts: **1608** | Location: **San Antonio, Texas** | Registered: **04 January 2010**

michael458
One of Us

posted 04 March 2010 04:24 Hide Post

Jim

Calmed down any? HEH!!!!! How far we have come eh? I see your post over on DR has dropped to the 2cd page of the forum now, without a comment. Well……I also see Mikes post has dropped over to page 3 of the forum? Seems they are far more interested in Searcy Responds to Wieland and other sorts of things, and not really shooting the things? I suppose anyway! None of my business! Mikes efforts are extreme, and he has proven a great deal with his efforts, and here they are far more appreciated and paid attention to.

As for the other works, I think we are narrowing things down on the solids for sure. How about the sheet I sent to you? Make anything out of any of that mess?

After shooting the lever gun today I just want to go bust something with that 500 gr Hornady and watch it splatter!

Michael

http://www.b-mriflesandcartridges.com/default.html

The New Word is "Non-Conventional", add "Conventional" to the Endangered Species List!
Live Outside The Box of "Conventional Wisdom"

Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

I Bin Therbefor
One of Us

posted 04 March 2010 04:34 Hide Post

quote:

> Many years ago I read in some studies that a high speed bullet has an airflow envelope in front of the bullet as well as alone side and behind and that the shape of this airflow envelope changes as the style of the bullet changes.
>
> So I now have a question along these lines. Here's the static data…bullet is a 70% meplat FN bullet and here are the questions:
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> 3) Is the explosive cavity we see in test media the result of the bullet impacting the test media or the bullet's airflow envelope?

Above Mach 1, the speed of sound, which varies with temperature of the air and composition of the air, a shock wave forms in front of the bullet such that the shock wave hits the target before the bullet does. The shape of the shock wave is definately bullet shape sensitive. At a temperature of 15 degrees Celsius, the speed of sound is 340.3 m/s[2] (1225 km/h, or 761.2 mph, or 661.5 knots, or 1116 ft/s) in the Earth's atmosphere.

A quote from Wikipedia:

"When an aircraft exceeds Mach 1 (i.e. the sound barrier) a large pressure difference is created just in front of the aircraft. This abrupt pressure difference, called a shock wave, spreads backward and outward from the aircraft in a cone shape (a so-called Mach cone). It is this shock wave that causes the sonic boom heard as a fast moving aircraft travels overhead. A person inside the aircraft will not hear this. The higher the speed, the more narrow the cone; at just over M=1 it is hardly a cone at all, but closer to a slightly concave plane.

At fully supersonic speed, the shock wave starts to take its cone shape and flow is either completely supersonic, or (in case of a **blunt object**), only a very small subsonic flow area remains between the object's nose and the shock wave it creates ahead of itself. (In the case of a sharp object, there is no air between the nose and the shock wave: the shock wave starts from the nose.)

As the Mach number increases, so does the strength of the shock wave and the Mach cone becomes increasingly narrow. As the fluid flow crosses the shock wave, its speed is reduced and temperature, pressure, and density increase. The stronger the shock, the greater the changes. At high enough Mach numbers the temperature increases so much over the shock that ionization and dissociation of gas molecules behind the shock wave begin. Such flows are called hypersonic."

Couple of things, the strength of the shock wave increases with the speed of the bullet. As the bullet is blunt shaped you have a shock wave shaped by the objects nose. With proper shaping the shock wave will "break" at the edge of the blunt part and form a low pressure area between the shock wave and the body the the bullet.

IMO. For a supersonic blunt bullet: The shock wave is NOT formed 1 1/2" ahead of the bullet, but rather much closer. The shock wave will definately precede the bullet into the object. The faster the bullet goes the closer the shock wave will be to the front of the bullet. Shock waves are real energy and can do real damage by over-pressurization. I'm NOT talking about the so-called "shock effect". I have no idea what the spin on a bullet does to the shock wave! The shock wave shape will be different based on the shape of the bullet.

Posts: **404** | Registered: **08 May 2005**

michael458
One of Us

posted 04 March 2010 04:34 Hide Post

Oh one more tidbit of info, I spoke with my buddy Corbin today, he is going to drop in Saturday morning, at which time he and I will be testing the 9.3 320 Woodleigh again, with two boxes, we will finally see where it goes once it leaves 64 inches of medium!

I also have some photos of that bullet and it's nose profile, I think that you guys can see the difference, but will have to post them in the morning.

So until then, I bid you good night!

Michael

http://www.b-mriflesandcartridges.com/default.html

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Posts: **8426** | Location: **South Carolina** | Registered: **23 June 2008**

someoldguy
One of Us

posted 04 March 2010 04:47 Hide Post

quote:

> Gentlemen I'm not trying to be an ass so please don't take it that way.
>
> quote:
>
> quote:
> I just assumed that a bullet stopped spinning on impact. But pretty clearly it doesn't stop spinning!
>
> Agreed, spinning cannot stop abruptly, but how many spins would a bullet in a 10-inch twist and a 14-inch twist complete in an animal of say 30 inches? It is this difference that is under investigation here, not so?
>
> Unfortunately to determine this specific piece of information would require a test medium that is sufficiently clear for photographic work and some extremely expensive high speed camera equipment in the range of thousands of photos per second. While the first might be doable do you know anyone at NASA, Lawrence Laboratories, or another organization with this quality of equipment that would loan us the use of their equipment for this purpose.

No, I don't think you're being an ass, Jim.
But like my mama said, if you're going to be an ass, then be the best ass you can be.*

*My mama didn't say that.

The only thing I was going on is the circumstantial evidence. And a few ifs. Mainly if a bullet's stability is determined by its rate of spin, then it is likely still spinning inside the target. Like phatman points out:

quote:

> Do the bullets keep spinning after they hit?
> Yes they do.
> Just go to the Barnes Bullets web site and look at the videos.
> When they stop spinning they start to get unstable. You can see that too.

Whether bullets maintain direct contact inside the target or not, thanks to air or a vacuum, it seems undeniable that they would for sure have contact on impact. The only explanation I can offer about why roundnose bullets generally go unstable more easily is just a guess, and I've already mentioned it. It's because they have a larger impacting surface area than flatnose bullets and their rate of spin is affected by at least the initial collision. But that's only a hypothesis.

_____

Glenn

Posts: **942** | Location: **Alabama** | Registered: **16 July 2007**

capoward
One of Us

posted 04 March 2010 05:33 | Hide Post

Michael,
Yes I've calmed down... ...wasn't trying to be uptight either!

Finished half the yard work wife has fed me a good meal...gave me some coffee and allowed me to clean the utensils and pans from the cake batter and frosting so yes I'm copacetic right now.

I did respond to your email about 1 ½ hours after you sent it. Just in case you didn't see it I thought the spread sheet was great and I intend to keep a copy for my future use.

Just think, perhaps the DR guys are now reading this thread to keep up the 21st century work in usable ballistics. : rolleyes:

John, Here's the closest I can come over the internet And thank you for the video link info.

IBT and Glenn, Thank you for the additional information and clarification.

Jim
"Life's hard; it's harder if you're stupid"
John Wayne

Posts: **4954** | Location: **Central Texas** | Registered: **15 September 2007**

RIP
one of us

posted 04 March 2010 05:59 | Hide Post

Doc M,
Corbin of NC?
If he is same helpful gunnutt I know, then we have a mutual friend. Say "hi" to Corbin for me.

John, Glenn, Jim, and all y'all with good heads free and clear of the goat:
Of course the bullet continues to spin inside the temporary wound cavity. That has been high-speed-filmed many times in transparent media, gelatin and water, and spinning bullets are seen emerging from shattered/penetrated plastic, wood, glass, metals, fabrics, etc.
The shock wave at the front of a supersonic bullet vanishes as it meets the denser medium, where the speed of sound is much higher in the denser medium.
The bullet nose does contact the medium at the stagnation pressure point at the center of the meplat.
The medium is instantaneusly parted at that point and flows radially outward from that point.
It is flung outward by the near instantaneous momentum transfer from the bullet to the medium. That is a high G acceletation!
As the bullet continues onward, the medium continues expanding and cavitatimg around the sides pf the bullet and behind it.
The bullet plows onward, spinning in a cavity that is a relative vacuum compared to air!
Spin still stabilizes in the cavity.
Warrior with his "number of revolutions in the goat" has his head deep in the ass of the goat.

Posts: **28032** | Location: **KY** | Registered: **09 December 2001**

RIP
one of us

posted 04 March 2010 06:08 | Hide Post

Oh yeah, still studying Doc M's spread sheet too,
fascinated, I am!
He is putting a new spin on things.
It's called "the truth."
Advanced postdoctoral fellowship work in terminal ballistics.

Posts: **28032** | Location: **KY** | Registered: **09 December 2001**

I Bin Therbefor
One of Us

posted 04 March 2010 06:22 | Hide Post

quote:

> Originally posted by RIP:
> Doc M,
> Corbin of NC?
> If he is same helpful gunnutt I know, then we have a mutual friend. Say "hi" to Corbin for me.
>
> John, Glenn, Jim, and all y'all with good heads free and clear of the goat:
> Of course the bullet continues to spin inside the temporary wound cavity. That has been high-speed-filmed many times in transparent media, gelatin and water, and spinning bullets are seen emerging from shattered/penetrated plastic, wood, glass, metals, fabrics, etc.
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> As the bullet continues onward, the medium continues expanding and cavitatimg around the sides pf the bullet and behind it.
> The bullet plows onward, spinning in a cavity that is a relative vacuum compared to air!
> Spin still stabilizes in the cavity.
> Warrior with his "number of revolutions in the goat" has his head deep in the ass of the goat.

I wonder about the shock wave "vanishing". I believe that there has to be an energy transfer from the shock wave to the target before the bullet actually hits. I've seen too much structural damage done by shock waves to hold with the "vanishing" statement.

I agree that the creation of a shock inside the target would depend on the density of the medium which I do not know except to say it definately is greater than air. Without evidence to the contrary, I accept your statement that no shock wave is formed inside the animal by the velocity of the bullet.

I wonder what difference it would make to the enegry transfer (not stability) if the bullet were not spinning as occures with a smooth bore launched, fin stabilized projectile. Would they both create the same wound channel? ???

Posts: **404** | Registered: **08 May 2005**

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