

# TriTech

## Training/Mission First!.....

### “Braking” The Recoil Beast

*This is the Winchester 70 barrel with knurled thread protector in place. Above from left to right are the Tactical/Prone, the Hunter, and the Magnum brakes from TTT/Mission First!*

#### BY JERRY STORDAHL

Recoil is a consequence of shooting. Each time a powder charge is ignited, and a bullet is launched down a barrel, the shooter must deal with the effects of the recoil beast. The severity of the energy, or the foot pounds of punch on the shoulder, depends on the cartridge, the weight of the bullet, and the amount of powder burned. The effect on the shooter depends on the stock design, the heft of the firearm, and to a certain extent, the type of action.

From the lowly .22 rimfire to the gigantic .50 BMG, the recoil “beast” vastly differs in its power. The fierce recoiling calibers may seem to project thumping hooves and buffeting horns, but TriTech Training/Mission First! has developed their “High Performance Muzzle-brake Technology” (HPMT) to ease the recoil factor. Their products will perform a significant job of “braking” the beast, and that means more comfortable shooting and greater assurance in accuracy.

Though muzzle brakes do not alter the laws of physics, they work to reduce muzzle rise and the resul-

tant kick at the shoulder, by directing escaping hot gasses through ports to create work. The area size of the holes in the muzzle brake should generally exceed the size of the exit bore. The holes should not taper from the inner surface to the outer, as tapering increases the cross section of the port and cools the gasses. Cooling the gas is what we want from a flash suppressor, but a brake needs hot gas to create the required work. A large inside diameter, prior to the point of bullet exit makes the gas cluster and push or work against the exit flange, or in some designs, small inclined shoulders are used, to push the muzzle forward. Remember the hot gas is being directed to do work, and the work performed depends on the pressure, temperature, and volume of the gas, as defined by the various gas laws. Controlling the gas energy has successfully made rifles easier to shoot.

TriTech Training/Mission First! offers several different brakes to choose from, and the goal is to control both sound and recoil. Many brakes increase the noise level between 11-15 decibels, however the Mission First! brakes offer advantages. Richard A. Garcia, the

President and owner of TriTech Training/Mission First!, consulted with leading design experts in gas and muzzle brake technology, to incorporate the highest standards of performance and quality into their line of brakes. Their goal is to offer unsurpassed recoil reduction, without excessive increases in noise. The finest quality materials are used, either 416 stainless or blued carbon steel, and both are heat treated. The Mission First brakes also incorporate a larger chamber directly in front of the threaded portion, to help prevent erosion of the barrel’s crown. Their product design technology is protected under patent numbers 675206B2 and 6820530B2.

A “Mini” Magnum brake is available for calibers .224 through .308 which gives about a 7 decibel increase in sound over a bare muzzle.

A Magnum brake is offered for .224 through .458 bore sizes in various outside dimensions, depending on the barrel measurement and caliber. An 8 decibel increase in sound is expected using this model.

The Hunter brake is the long, quiet one. Available in .224 through

Continued on next page

## TriTech Training/Mission First!.....

Continued

.375 calibers, the diameter depends on the outside dimension of the barrel. This unit is 3 inches long and was specifically designed for its sound controlling effectiveness, without sacrificing any “felt” recoil reduction characteristics. The Hunter

brake will only increase the sound 3 to 4 decibels over a nonbraked barrel.

The Tactical/Prone brake is designed to prevent blowing dust and debris from the ground upon firing. Not only could the flying gravel injure a neighboring shooter or nearby equipment, as in a match scenario, but in a tactical situation, a dust signature could give away a

shooter’s location, attracting return fire. This brake is unsurpassed for a tactical or prone shooting application. It is available in .224 through .458 caliber bore sizes, the same as the Magnum brake.

The Benchrest .50 Magnum brake is the godzilla of brakes! With a 1.5 inch outside diameter, it is designed for a low dust signature and maximum recoil reduction. The .50 Tactical/Prone is another 1.5 inch gorilla, which provides recoil reduction performance in conjunction with a closed bottom, to prevent pebbles from becoming missiles into adjacent areas. There is no need to wear teeth guards and dust mask, if you’re in the immediate vicinity!

The SA/Semi Auto brake effectively controls muzzle climb in rapid fire circumstances by replacing the A2 birdcage flash suppressor on the AR15 platform. It retains the original birdcage diameter and length and is provided with two flats for use of the armorer’s wrench for installation and removal. The original standard 1/2x28 threads per inch are used, and there is a 7 decibel increase in sound using the SA brake.

A FA/Full Auto version is designed around the dimensions of the A2 birdcage flash suppressor also. The body is slightly longer with extra gas ports, and a 7 decibel increase in sound can be expected. Muzzle climb is controlled in burst fire and full auto mode by utilizing this brake, and these are not recommended for semi autos.

Flash suppressors may look similar, but their goal is to reduce the flash at the muzzle in low light firing. This helps the shooter retain sight of the target for repeat shots. Flash suppressors work by expanding and cooling the discharged bore gasses, the opposite of what is done through a muzzle brake, but the brakes



*TriTech Training/Mission First!, muzzle brakes; From left to right, the Hunter, the Tactical/Prone, the Magnum, and the SA/Semi Auto for AR15s.*



*Here is a comparison in design; the A2 birdcage flash suppressor on the left and the TTT/Mission First! SA/Semi Auto AR15 brake on the right.*

usually reduce flash in comparison to a plain muzzle.

There are a number of categories of shoulder fired arms that could benefit from reduction of muzzle jump and "felt" recoil. The semi automatic family of weapons is one such category, and the AR15 in particular is often fitted with a brake. Any shooter who fires an AR15 knows the 5.56/.223 cartridge offers negligible recoil, but the brakes on these carbines are there to allow fast repeat shots.

Those shooters engaging in "Three Gun" or "IPSC Competition" often use muzzle brakes or compensators to reacquire a sight picture in less time. A good brake keeps the muzzle from deflecting upwards and off the target, by using the combustion gasses to arrest recoil. When a cartridge is fired, the mass of the bolt carrier and buffer driving rearward is also a factor in upsetting the sight picture. As the carrier slams to the rear inside the stock, the recoil spring then accelerates the carrier forward, stripping a cartridge and chambering the round as the bolt slams into battery. Reducing muzzle jump helps retain an effective sight picture, despite the secondary forces of the reciprocating bolt mass. Note that some shooters "tune" their carbines by installing lightened bolt carriers and buffers. This would be for faster cycling and reduced bolt slam, but the operating window of the cycling is reduced. There is less time for a fired case to be extracted and ejected and a new cartridge stripped from the magazine. It can set in motion a whole new set of cycling problems to solve, so if you need to bet your life on your AR, leave the bolt carrier stock. Reliability is of greater importance in a defensive or law enforcement carbine than faster bolt carrier cycling.

The obvious candidates for a

Mission First muzzle brake are bolt action rifles chambered in heavy calibers. The .50 Browning Machine Gun cartridge and Remington's line of "Ultra Mags" would be viable candidates for Mission First muzzle brakes. The various Weatherby Magnums above thirty caliber, and the .338 Lapua Magnum would be suitable recipients for the same muzzle brake technology. That is where one would find most of the brakes upon examining rifles, but there are other possibilities, too.

Lightweight hunting rifles would benefit.....especially if chambered for any of the various magnum cartridges. Sheep hunters like these. Climbing the high country is tough work, and light rifles are desirable. In fact, the more I read, the more I find that today's hunter is more concerned with "carrying weight" than anything else. For big game

hunting, that is an important factor to some, as the rifle will be carried, more than it is shot. When it is fired, the number of shots will likely be few. I figure a 9 pound loaded field weight on a scoped rifle is easy enough to carry, but some shooters like super light fiberglass stocks and thin barrels.....a carrying weight of under 7 pounds with a scope. That is light, but if they are chambered in even a medium sized cartridge, they will kick like an ornery mule.....off the bench. Recoil isn't really felt all that much during a hunting situation, as one's attention is focussed on the quarry, but in anything lightweight, or in any magnum chambered rifle, a Mission First! "High Performance" muzzle brake can aid the shot. A well placed shot in the vitals means success.

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Simple recoil reduction not only can enhance shooting accurately, but it will allow a rifleman to shoot more.....without the pain of a bruised shoulder. The extra practice will strengthen the rifleman's confidence and precision. Reduced muzzle jump can aid in faster cycling of the bolt for a repeat shot, and depending on caliber, a muzzle brake equipped rifle allows "an eye on target" through the scope, as the rifle recoils.

Reducing felt recoil is all about overall performance, and installing a TriTech Training/Mission First! muzzle brake is a move towards tailoring that performance into useful parameters, by managing the recoil thrust. Each shooter has different needs and opposing opinions in regards to caliber selection and experience. Some will need a brake to shoot effectively, and some will adjust mentally to the situation,

handling the pounding at the shoulder, as if it were merely a walk in the park. Whether a brake is used or not, a rifleman must concentrate on the shot, ignoring and shutting out everything, except settling the cross hairs on target and triggering the perfect shot.

I learned about recoil as a teenager, and the lessons began with a single shot 12 gauge shotgun, with "Long Tom" roll marked on the side. The barrel was a full 36 inches with a splinter forend, and the stock had enough drop to reach China. The hard black butt plate looked as menacing as a thug, and the gun only weighed about five pounds. Oh yes, I found out about recoil! Unless I placed my firing hand's thumb exactly right, the recoil would jam my thumb against the opening lever, and the "Long Tom" would conveniently break open upon firing. I had to use extra care, otherwise I'd trip over the long barrel or jam it into the dirt. I used that long gun to down my first whitetail buck, and yes, the slugs made it kick like a bee stung

mustang. I was young. I could handle it. I finally obtained a centerfire rifle, a Remington 700 in .25-06. After the "Long Tom," I thought the Remington felt like a .22 rimfire.

By the time I was old enough to be paying my own bills, I had discovered an Idaho shooter named Elmer Keith. After that, I sought every cartridge that would perform to the absolute maximum from .220 Swifts on up. Following Elmer Keith's philosophy, I nabbed a .458 Winchester Magnum for maximum power against Alaskan bears during a mining venture. The Winchester Model 70 had enough weight in the heavy barrel, and the stock was designed to handle recoil, along with a rubber recoil pad. It seemed more pleasant to shoot than the old "Long Tom." I was young. I could handle it, and I loved the size of the "fat" magnum cartridges.

Somewhere along the way, I let the .458 go and settled on a .375 H&H Magnum. After all, I didn't need to sling a 500 grain walnut sized slug, if a 300 grain acorn sized one would do the job. At this point, age was beginning to insert a bit of wisdom, and I was still learning about recoil.

A friend in Alaska had just downed a big Grizzly with his .375 Magnum, which further proved the premise of a 300 grain slug as adequate medicine for ornery bears. The bear had moved in and claimed a moose carcass while he was packing out the meat. Upon returning for another load, the bear attacked and was killed with a single .375 bullet. I doubt if that fellow remembered any recoil at the time. The bear made a beautiful rug, and I determined the .375 H&H Magnum was the perfect cartridge.

Though, I have never been particularly concerned with recoil, as the

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years piled up, I have come to like it less and less. Sometimes, it is nice to receive a gentle thump.....instead of a jolting "impact" when a shot is fired. There is some truth to the statement, "older is wiser."

I decided to give the Mission First! brakes a try, just to see what they could do. I sent a Winchester Model 70 in 7 mm. Remington Magnum chambering to receive the 32 tpi. threading at the muzzle and the resulting screw on "perforated tubes."

The rifle utilizes the Model 70 "Classic" controlled round feed action and sports a heavy 26 inch barrel. The muzzle diameter measures .807 inches, and it was advertised in the Winchester lineup beginning about eight years ago. "Laredo" was the designation used, and it lasted only about three or four years before being dropped from the catalog. As I stated earlier, hunters wanted light rifles, and this particular Winchester scaled about 9.5 pounds before the scope and mounts and ammo had been added. Final carrying weight with all the accessories scales 12 pounds.

This is a rifle built for shooting from a stand or from prone, across wide open spaces, and would most likely be utilized with a bipod or sand bag rest. This particular Winchester became the perfect candidate to test the Mission First! "High Performance Muzzlebrake Technology." Firing from the prone position, the shooter's torso receives all the recoil force, with little chance of body roll or flexibility. Repeated shots can be painful unless a Mission First! muzzle brake is installed and doing its work, though a rubber recoil pad will always be welcome.

During load development quite awhile back, I found the 7mm. Magnum Winchester to shoot reasonably

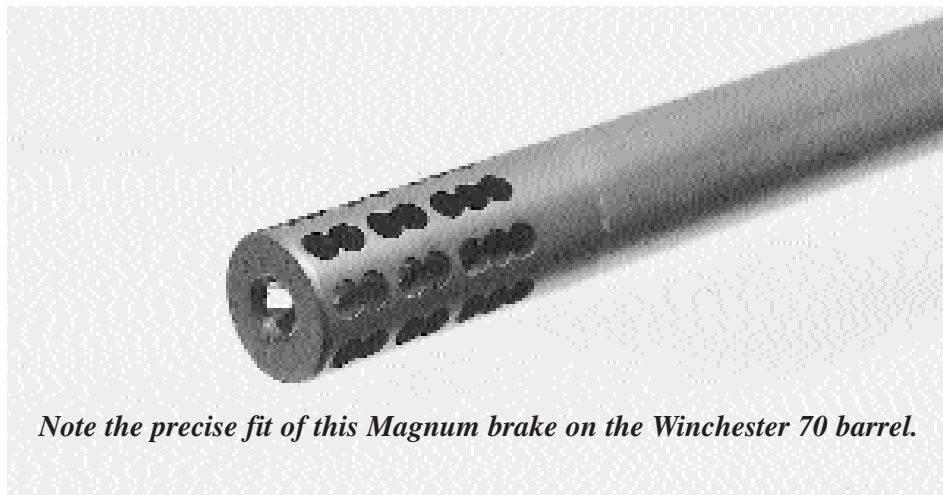
well with 168 grain Sierra Match Kings. Winchester fireformed brass was used with 65.6 grs. of H4831 powder and Federal 215 Magnum primers. This is Sierra's listed "accuracy load" in the 1995 "50th Anniversary Edition" of their reloading manual. The Match Kings run 2980-3000 fps. in this rifle, nearly identical to Sierra's data, and it punches from .5 to one inch groups at 100 yards for five shots, if I do my part in the equation. It shoots under minute of angle at 200 and 300 yard ranges in windy conditions from a bipod, as long as I hold right.

Since I had a bunch of this ammunition ready, I used it for testing the recoil jump. Sierra does not recommend this bullet for hunting purposes, and please start low and

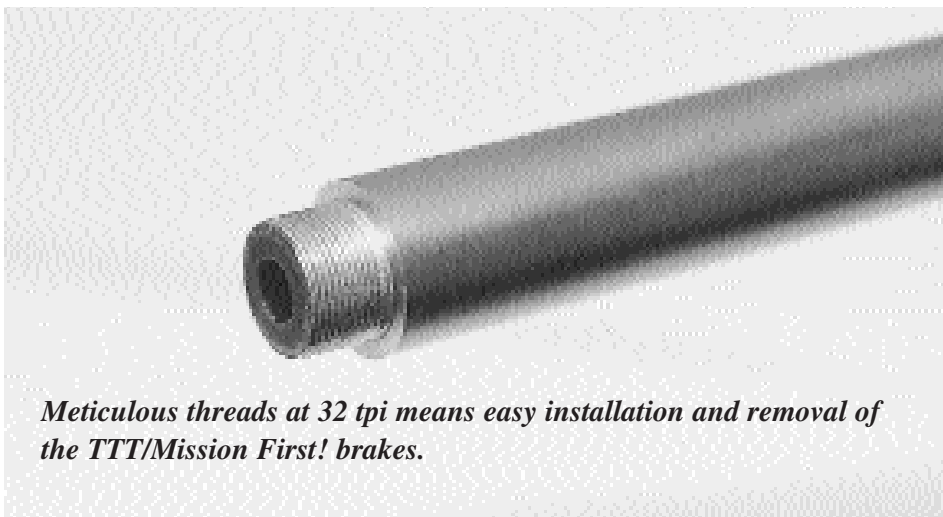
work up to maximum loads. The listed load is a maximum charge and is acceptable in the author's rifle.....use caution.

I was able to test fire three different models of Mission First! "High Performance" brakes on the 7 Magnum, and as I unwrapped the blued pieces of steel and threaded them one at a time on the Winchester barrel, I concluded.....these are beautiful units! They fit so perfectly, the junction between barrel and brake is unnoticeable. The threads are straight and clean, and a knurled thread protector was fitted for nonbrake use. The excellent machining and "High Performance" technology is what a shooter can

Continued on next page



*Note the precise fit of this Magnum brake on the Winchester 70 barrel.*



*Meticulous threads at 32 tpi means easy installation and removal of the TTT/Mission First! brakes.*

## TriTech Training/Mission First!.....

Continued

expect from Richard Garcia's, TriTech Training/Mission First! brakes.....top drawer!

First, after installing the barrelled action into the fiberglass HS Precision stock, I fired the plain barrel with thread protector installed, to zero the rifle with the Leupold 3.5-10 LR optic. The scope sits in Badger Ordnance rings on a Badger Ordnance rail, a top quality set of mounting components.

I screwed on the Magnum brake first, and fired three rounds. The blast/noise was louder than a bare muzzle, as expected, but the recoil jump was a pleasant "reduced" surprise. The Magnum brake is 1.948 inches long and .807 in outside diameter, so it fits flush with the

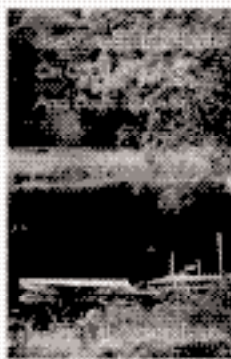
Winchester's barrel profile. Eight rows of ports are spaced around the circumference of the cylinder, with the holes measuring .187 inches. Looking inside from the threaded end, one can see a cone shaped chamber tapering to the .304 sized exit hole. The groups stayed about the same as if firing with the plain muzzle, and then I threaded the Hunter brake in place.

With the already long 26 inch barrel, the Hunter added another 2.5 inches, but that didn't matter to me, especially as it is not a carrying rifle as much as it is a "stand" rifle. The Hunter brake is rated to increase the noise level by only 3-4 decibels, and the sound reduction was noticeable as compared to the Magnum brake. The Hunter brake employs a tubular chamber 1.2 inches long from the inner termination of the threads and forward. Then it abruptly transitions

to the .304 exit with its eight rows of ports. Again, the pleasant recoil impulses throughout the string of shots, had me grinning from ear to ear. The combination of a heavy rifle, a fairly powerful cartridge, and a Mission First! brake, offered significant recoil reduction advantages off the bench and from the prone position.

And the final Mission First! brake that I tried on the 7 Magnum was the Tactical/Prone unit. This particular model is 2.050 inches long and has two rows of ports on each side of the horizontal plane. I fired all the remaining loads from prone, using this brake. I moved out to 300 yards and laid in the snow, using a Harris bipod to support the forend and a gloved hand to control the butt. Despite the 20 mph rear quartering wind, groups stayed under minute of angle. Recoil was pleasant.....a

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light jump. On that day, I fired over 40 rounds of 7 Magnum handloads in about two hours. I walked back and forth to my targets grinning from ear to ear. The 7 Magnum reminded me of that first .25-06 when comparing recoil.

Getting back to light recoiling, semi automatic rifles, I also got my hands on a TriTech Training/Mission First! muzzle brake for an AR15. My MT6400 Colt carbine was fitted with a pinned on muzzle brake prior to the “sunset” of the ban and the requirement of a permanently attached muzzle device, that was not a flash suppressor. The factory compensator worked well, but I wanted a threaded muzzle, to which I could now legally add an A2 flash suppressor.

The barrelled upper was sent off for threading in the standard 1/2x28 threads per inch, for A2 flash suppressor installation. The AR brake from Mission First! was threaded to fit the standard threads, so I could interchange the flash suppressor and muzzle brake.

The Mission First SA brake measures 1.750 inches long, with eight rows of .203 inch ports. The A2 bird-cage runs 1.750 inches in length, also. I tested for accuracy between the two and noted no variations in group sizes which run about 1.5 inches with Hornady 75 grain Match bullets over 25 grains of Varget. I fired a bunch of rounds in daylight, using the Aimpoint M2 mounted on the MT6400 carbine. The “dot” barely moved off the center of the white paper plates I had stapled to the target board. The SA brake simply works!

I also fired in low light conditions to evaluate the muzzle flash reduction capabilities of the A2 versus the SA brake, with an observer standing to one side, about fifteen feet away. A half moon in the sky, and a

mercury yard light gave the low light effect of a typical city street at night, as I fired in the shadows.

Three different loads were fired, first with the plain muzzle. Black Hills/Hornady 75 grain blue box gave a jagged flash the size of a skinny football. The 75 grain Hornady Match bullet over 25 grains of Varget produced a short round flash the size of a grapefruit. Another load utilizing a 55 grain Nosler with 26.5 grains of Winchester 748 created a football sized flame, the largest flash of the rounds fired with a bare muzzle.

After installing the Mission First SA brake, I found the Winchester 748 load produced a two inch flame with a scattered starburst effect shooting sparks through the brake’s ports. The Black Hills load gave a one inch long tongue of flame with the same starburst, and the Varget load was nearly identical, a one inch sliver of flame with sparks discharging through the ports. The Mission First brake dissipated the flash enough to far exceed the results with a bare muzzle. I would prefer to use the SA brake instead of a plain crowned barrel on the AR15 carbine platform.

When shooting with the A2 bird-cage installed, the Winchester 748 load spit a three inch long sliver of flame, but the color was significantly subdued, indicating the cooling effect of the flash suppressor on the gasses. The Black Hills load produced a one half inch sparkle in a very subdued hue. The Varget load created a three inch long very thin, needle of subdued color flame. In all three loads, small tines of flame spurted up through the elongated suppressor cuts of the A2 flash suppressor.

The Mission First! SA brake fell in between the A2 and a bare muzzle as expected. The flash was evident,

but the target easily remained visible for repeat shots. The shooter would have to weigh the repeat shot advantage of the SA brake versus the flash suppression of the A2. Perhaps it would be best to have both on hand. One could use the brake or the flash suppressor as the mission dictates, but a bare muzzle is not desirable in a defensive carbine.

By carefully selecting the equipment, performance can be enhanced. Reducing felt recoil is about tailoring overall performance of the rifle and shooter combination. High performance can be achieved, with TriTech Training/Mission First!.....and “braking” the recoil beast.

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