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EXCLUSIVE
IN-DEPTH
SHOOTING
REPORT

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The Most Important Part Of A Rifle

BY RICHARD MANN



When it comes to achieving optimum accuracy, a good trigger is paramount.

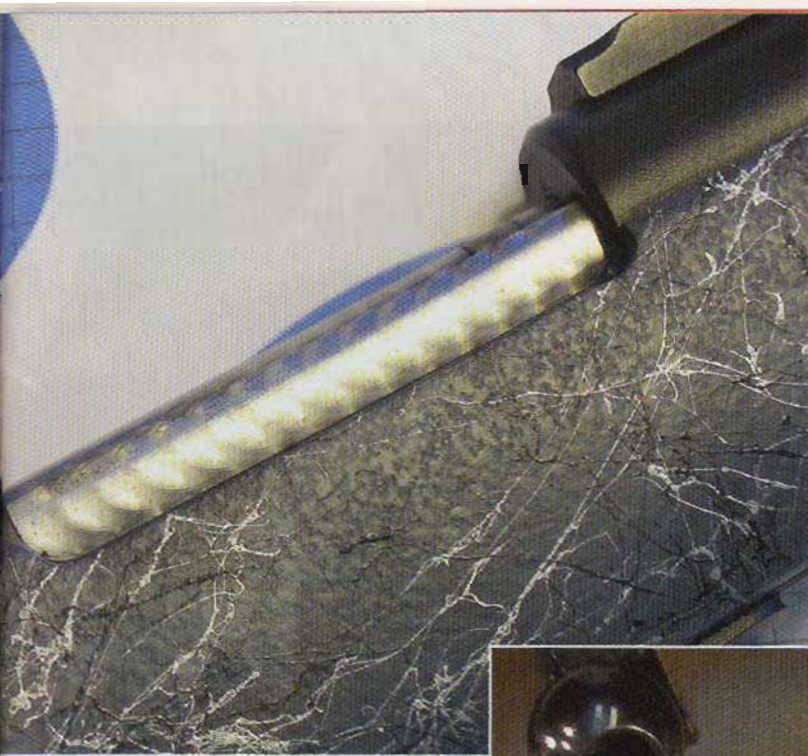
The trigger may be the most important mechanical part of a rifle, so it deserves attention. It is the “go” switch, and if you are looking to place bullets accurately, you will need a trigger that operates at the highest level of precision.

When a shooter squeezes a trigger, a series of events is set in motion that hopefully results in the bullet striking the intended spot. For this to happen the shooter must properly manipulate the trigger, and the trigger must release without disturbing the relationship of the rifle to the point of aim. Other variables, such as sights and the interaction between the rifle and ammunition, also influence accuracy, but to realize the full potential of a rifle

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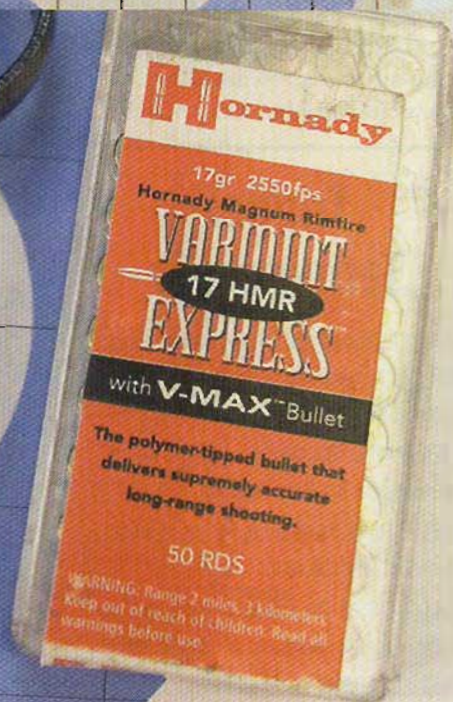
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we should do our part to eliminate the influences that trigger function have in the equation. This means we must learn to squeeze triggers and make sure the triggers provide consistent operation. A trigger that breaks crisply and cleanly with minimal take-up, creep, and overtravel is much easier to master.

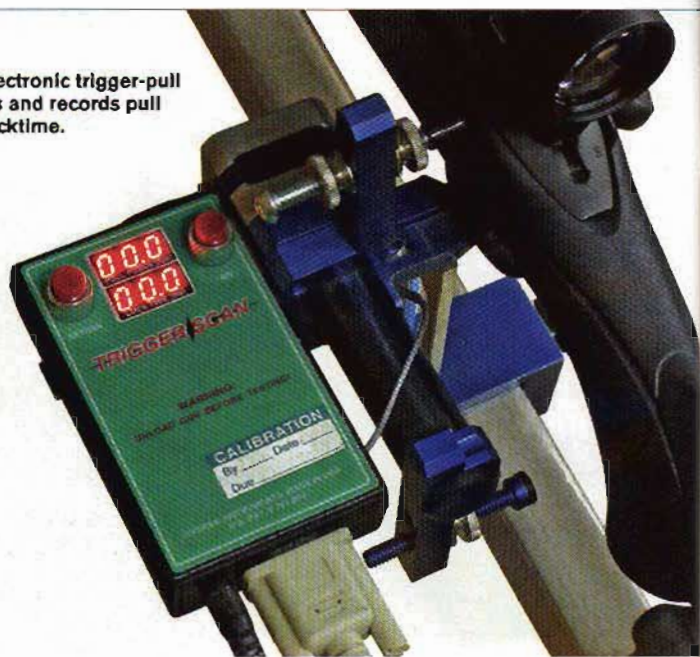
How Triggers Work

When a trigger is pressed the trigger or a trigger bar that is connected to the trigger releases the sear, which is under spring tension. The sear then falls away from the cocking piece or hammer,



Tight groups are impossible to attain with a trigger that demonstrates long take-up, creep, or overtravel. Using a good, consistent trigger allows a rifle to perform to its potential.

The Dvorak TriggerScan is an electronic trigger-pull measuring device that measures and records pull weight, creep, overtravel, and locktime.



which in turn makes the firing pin strike the primer. A rough bearing surface between the trigger and sear will feel gritty and will release at an unpredictable moment. Too much bearing surface will result in excessive creep, but not enough bearing surface can be dangerous. Last year a professional hunter in Africa was

showing me his new "stopping rifle" in .458 Lott. The trigger had been "worked" and on occasion when the rifle's safety was placed to "Fire," the rifle would go bang! The first time this happened he launched a 500-grain solid over the mountain behind his lodge. The culprit was insufficient sear engagement. The trigger pull was light and crisp but extremely dangerous; a few stokes with a flat file "safed-up" the trigger until he could acquire a replacement.

about a hundred bucks for the work. And you shouldn't trust just anyone to do the work. Shooters looking to work their rifle's trigger should resist the urge to tamper with the mechanism themselves unless they are extremely trigger savvy. It should also be mentioned that "work" and "adjust" are two different operations. Most replacement triggers, and a few factory triggers, are shooter adjustable, but what I'm talking about here is modifying the trigger to produce consistent performance.

The good news is that in most cases a dependable aftermarket trigger can be had for about the same price as a trigger job, and if you have the skill to start a fire without gasoline you can do the work

Trigger Terminology

TRIGGER: The part of a firearm's mechanism designed to be moved by the finger in order to cause the firearm to discharge or fire.

OVERTRAVEL: The distance a trigger moves after the sear has been released.

CREEP: The distance a trigger moves while in contact with the sear.

PULL WEIGHT: The amount of force applied to the trigger to cause sear or hammer release.

SEAR ENGAGEMENT: Measurement of the contact area between the sear and trigger or trigger bar.

TRIGGER BAR: Connecting piece between the trigger and sear. ■

Fixing A Sick Trigger

There are two ways to fix a sick trigger. Work it or replace it. Most competent gunsmiths can improve trigger function. On average they will charge

Trigger Consistency

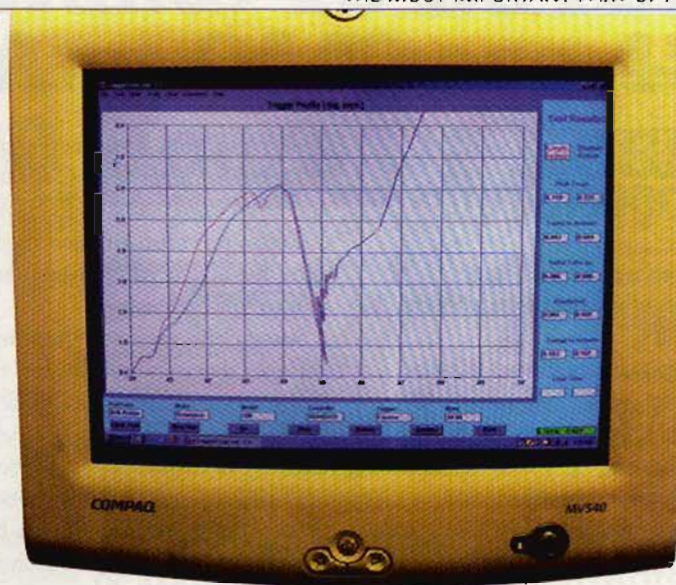
Trigger	Peak Force (Pounds)	Variance (Pounds)	Variance (Percent)	Take-Up (Inches)	Overtravel (Inches)	100-Yard Accuracy (Bench/Offhand) (Inches)
Remington Model 700 ADL						
Factory Remington	6.210	1.159	19	0.006	.092	2.63/9.10
Timney	2.103	.071	3	0.00	.019	1.91/6.22
Timney Prototype*	1.183	.013	1	0.00	.019	2.11/5.91

*The Timney prototype trigger has coated surfaces.

yourself. I just recently replaced a trigger in a Remington Model 700 Sendero with a new unit from Timney that comes with the safety already installed. Installation took less time than it does to change the oil in my Dodge Dakota, and the trigger pull weight dropped from an average of 5.4 pounds to a consistent 2.78 pounds. Pull weight variance decreased from almost a pound to less than a tenth of a pound.

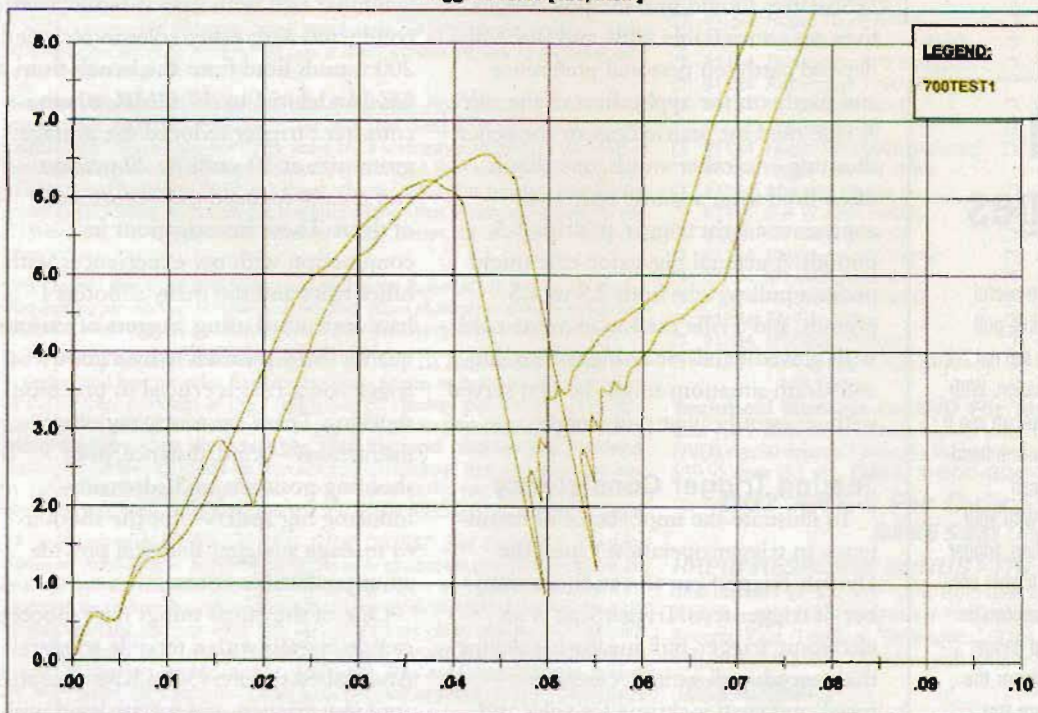
Consistency Is The Word

For a trigger to work properly it should break or release the sear crisply. This has been described as "breaking like a glass rod." This "break" and the trigger movement should be consistent to help



TriggerScan was used to evaluate the consistency of factory and aftermarket triggers. The data was transferred to a home computer where it was displayed as a graph. The graph was also printed out on a computer printer.

Trigger Profile [lbs, Inch]



Test Results:

Single Action	Double Action
---------------	---------------

Peak Force:

6.587	6.219
-------	-------

Travel to Actuate:

0.046	0.041
-------	-------

Initial Take-up:

0.005	0.005
-------	-------

Overtravel:

0.103	0.104
-------	-------

Energy to Actuate:

0.169	0.144
-------	-------

Lock Time

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GunType:	Make:	Model:	Serial No.:	Trigger:	Note:
Remington	TEST	700	66446976	Factory	30-06

Trigger Scan 1.1, SN 10225, printed by Sisk Rifles.

Jun-21-2006 08:56

10 Trigger Truths

1. All triggers are not created equal.
2. Engagement surface hardness influences trigger life.
3. Engagement surface slickness influences trigger feel.
4. The color of the trigger does not matter, even if it is gold.
5. Many triggers can be worked/tuned.
6. Triggers on most factory rifles will benefit from being tuned.
7. Most shooters are capable of installing or adjusting aftermarket triggers.
8. Few shooters are capable of correctly modifying a factory trigger.
9. Shooters communicate to their rifles via the trigger.
10. A good trigger helps you shoot better. ■

Handheld Trigger Gauges

Handheld trigger gauges are useful for determining an ostensible pull weight, but in reality they are not adequate for trigger evaluation. With extreme care and perseverance you can see if a trigger is somewhat consistent with a handheld gauge. If you are an experienced shooter, you can do about as well with your finger. As it pertains to good shooting, trigger pull weight is not as important as trigger consistency. That said, handheld gauges can be helpful. If you are using a handheld gauge, make sure you position it on the trigger the same way every time and make sure you apply force evenly and consistently for each test. Don't hold the rifle in one hand and the trigger pull gauge in the other. It's best to have the rifle held in some form of rest like the Tipton Best Gun Vise or similar unit. ■

your finger learn or develop a memory of how the trigger feels. Consistent is the operative word and is the performance criterion precision-minded shooters strive for in everything from ammunition to optics.

Some claim precision shooting requires a trigger that exhibits minimal resistance. I have a New Ultra Light Arms Model 20 RF rifle in .22 LR that I use for the majority of my offhand practice. I typically run about 50 rounds a week through it. When shooting my best I can keep five shots inside two inches at 50 yards from a standing, offhand position. The trigger is set at 2.5 pounds, a weight I find comfortable. I have adjusted the trigger to as high as 4 pounds and as low as 1.5 pounds with no appreciable difference in performance. This is because the trigger breaks crisply and consistently at whatever weight it is set.

Shooters should find the pull weight they are comfortable with, and this will depend partly on personal preference and partly on the application of the rifle. A rifle used for prairie dogs or for bench shooting—in other words, one that is often fired from a sturdy rest—will appreciate a light trigger, perhaps 1.5 pounds. A general big-game rifle might prefer a pull weight from 2.5 to 4.5 pounds, and a rifle used in extreme cold with gloved hands or in high-stress, life-and-death situations might be best served with an even heavier pull weight.

Testing Trigger Consistency

To illustrate the importance of consistency in trigger operation I used the Dvorak TriggerScan to conduct a number of trigger tests. TriggerScan is an electronic trigger-pull measuring device that records pull weight, creep, over-travel, and even locktime for rifles and handguns. A rifle cradle or rest is available that will hold the rifle and the measuring unit to eliminate all human influence. The cool part is that TriggerScan automatically transfers the data from each test directly to your computer where it is displayed on a graph giving

you a “trace” of the trigger's operation.

The first trigger test involved a Remington Model 700 ADL in .30-06. I evaluated the factory trigger, an off-the-shelf replacement trigger from Timney, and a prototype Timney trigger with coated surfaces. The results are listed in the chart on page 64. The most striking difference is in the variance or consistency of the triggers. The rifle was also fired for accuracy using factory Winchester 180-grain Power-Point ammunition. Ninety shots were fired from the bench and offhand to test the trigger's influence on accuracy. As the results show, a poor trigger is much easier to manage from a solid rest because the shooter can focus on trigger pull and not divide his attention between that and wobbly sight alignment. Offhand is a different story, and it's where it will become bloody difficult to make a bad trigger behave.

Similar tests with similar results were conducted with other rifles to include 200 rounds fired from the bench from a CZ Model 452 in .17 HMR where a consistent trigger reduced the average group size at 50 yards by 20 percent and greatly reduced the occurrence of flyers. These investigations in conjunction with my experiences with other rifles and the many shooters I have instructed using triggers of various quality show precisely why a good trigger on a rifle is crucial to precision shooting. There are too many other distractions—wind, distance, poor shooting positions, and adrenalin-inducing big antlers—for the shooter to manage a trigger that will provide an unpredictable release.

One of the worst things new shooters can do is train with a terrible trigger. And skilled shooters who have accepted atrocious triggers and maybe lived with one for years should kick those triggers to the curb and find new replacements. I promise that after one date with a good trigger you will be a happier shooter! **ST**

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