

Cartridge	Bullet Wt.	MV	Test Rifle	Action
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Subjective Rifle Recoil Table

By Chuck Hawks

For every action there is an equal and opposite reaction; that is one of the physical laws of our universe. This means that the momentum of a rifle's reaction will exactly equal the momentum of the bullet and powder gasses ejected from the barrel. In the shooting sports we call that reaction recoil or "kick." It can be measured or computed empirically and has been for the "Expanded Rifle Recoil Table," which you can find of the Tables, Charts and Lists index page.

Guns and Shooting Online member Clayton Yendry wrote to me and argued persuasively for a subjective recoil article, as he felt that the kick of his .325 WSM rifle was less severe than expected, based on the data in the objective "Expanded Rifle Recoil Table" and articles about the .325 WSM. After an exchange of e-mails and against my better judgment, I decided to comply with his request in the form of the table below. (Never say that we don't listen to our members, no matter how dangerous the rhetorical minefield they suggest we enter.)

Perceived recoil, what the shooter feels, is a highly subjective matter. It is influenced by many factors. One of the most important of these is the total weight of the rifle being fired, which definitely affects both objective and subjective recoil. Another is the fit and shape of the rifle stock, especially the length of pull, height and shape of the comb contact area and the area of the buttplate. A good recoil pad can help soften the blow to the shooter's shoulder. Gas-operated semi-automatic actions reduce apparent recoil by spreading it over a longer period of time. Most important of all, every individual has a different sensitivity to recoil. Actually, every shooter's recoil sensitivity varies considerably due to his or her mood, state of mind (we tend not to notice recoil when distracted by something else), physical condition (try shooting with a hangover some time) and so forth. Some shooters can tell the difference between the kick of a .243 Win. and a 6mm Rem., while others cannot tell the difference between a .270 Win. and a .325 WSM in rifles of the same weight. There are as many shades of gray in subjective recoil as there are shooters.

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These sorts of things cannot be accounted for in any recoil table. Please understand that there are dozens of loads for any given bullet weight in any cartridge that will produce similar velocity, but a different amount of recoil. Thus, any recoil table should be taken as approximate. Furthermore, the table below is entirely subjective, based on my experience. Your results WILL vary.

In 1909 the *British Textbook of Small Arms* stated that 15 ft. lbs. of free recoil energy was the maximum allowable for a military service rifle. (The standard British .303 Lee-Enfield infantry rifle was below that figure, as are most service rifles to this day.) The 1929 edition of the same textbook stated, in addition, that recoil velocity should not exceed 15 fps; above that velocity a gun-headache was very likely to occur. These figures remain practical maximums for the modern hunter.

Above this level recoil becomes increasingly intrusive and the effects of recoil are cumulative. The longer you shoot, and the harder the rifle kicks, the more likely you are to flinch. These are good things to remember when comparing rifle cartridges.

In addition, the position of your body when shooting influences how bothersome recoil becomes; prone is the worst position, shooting from a bench rest is second worst and standing is the best. Keep this in mind when comparing rifle cartridges and when shooting at the rifle range. I try to take hard kicking rifles in small doses.

The following subjective recoil ratings are based on shooting the test rifles from a bench rest while wearing street clothes, without the aid of a recoil reducing rest (Lead Sled) or additional recoil absorbing padding. Note that while recoil energy objectively determines the severity of the blow to the shoulder, recoil velocity determines how abrupt that blow feels. My subjective impression is that, with a well designed stock, recoil velocity above about 10 fps begins to feel like a sharp rap on the shoulder rather than an abrupt push.

Muzzle blast is another factor that subjectively increases recoil, although there is no actual connection between the two. (Muzzle blast hurts only the ears.) For example, the .223 and .22-250 are both very light kicking cartridges, but the .22-250 has considerably more muzzle blast and it is noticeably more disconcerting to shoot for that reason. I have tried to ignore the effects of muzzle blast in the tables below.

Cartridge	Bullet Wt.	MV	Test Rifle	Action
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For the purposes of this article I have grouped various rifle cartridges on a comparative basis according to how their recoil feels to me and I have limited this list to cartridges with which I am reasonably familiar. I have tried to include different models of rifles in the same caliber where possible. The subjective recoil categories I chose are Very Light, Light, Medium Light, Medium, Medium Heavy, Heavy, Very Heavy and Extreme. Objectively, those categories might correspond to recoil energy levels of about 0-3 ft. lbs., 4-6 ft. lbs., 7-11 ft. lbs., 12-15 ft. lbs., 16-22 ft. lbs., 23-35 ft. lbs., 36-49 ft. lbs. and 50+ ft. lbs., but this is a SUBJECTIVE list, so the actual recoil energy numbers do not apply.

Note that some cartridges appear in more than one category due to differences in the load or test rifles. In the tables, bullet weight is given in grains (gr.) and muzzle velocity (MV) in feet-per-second (fps). Remington Managed Recoil factory loads are indicated by (MR) after the caliber.

VERY LIGHT RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
.17 Mach 2	17 gr.	2100 fps	Anschutz 1502 DHB	Bolt
.17 HMR	17 gr.	2550 fps	Anschutz 1717 DKL	Bolt
.17 HMR	20 gr.	2375 fps	Henry Golden Boy	Lever
.22 Short	27 gr.	1105 fps	Rem. No. 6	Rolling Block
.22 LR Stinger	32 gr.	1640 fps	Browning A-Bolt Medallion	Bolt
.22 LR	36 gr.	1260 fps	Rem. Nylon 66	Autoloader
.22 LR	40 gr.	1255 fps	Marlin Model 39M	Lever
.22 WRF	45 gr.	1300 fps	Savage Model 24	Break-open
.22 WMR	40 gr.	1910 fps	Henry Octagon Frontier	Lever
.22 Hornet	35 gr.	3100 fps	Custom Double	Break-open
.22 Hornet	45 gr.	2690 fps	Custom Double	Break-open

LIGHT RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
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Cartridge	Bullet Wt.	MV	Test Rifle	Action
.222 Rem.	50 gr.	3140 fps	Custom Rem. Model 700	Bolt
.223 Rem.	50 gr.	3425 fps	NEF Handi-Rifle	Break-Open
.223 Rem.	55 gr.	3240 fps	Kimber 84 Longmaster	Bolt
.223 Rem.	60 gr.	3000 fps	Savage Model 12 Low Profile	Bolt
.22-250 Rem.	45 gr.	4000 fps	Savage Model 16	Bolt
.22-250 Rem.	50 gr.	3800 fps	Savage Model 16	Bolt
.22-250 Rem.	55 gr.	3680 fps	Savage Model 16	Bolt
.220 Swift	50 gr.	3850 fps	Ruger Model KM77VT	Bolt
.220 Swift	55 gr.	3680 fps	Ruger Model KM77VT	Bolt
.220 Swift	60 gr.	3600 fps	Ruger Model KM77VT	Bolt
.30 Carbine	110 gr.	1990 fps	U.S. M1 Carbine	Autoloading
.357 Mag.	158 gr.	1830 fps	Marlin Model 1894	Lever
.357 Mag.	180 gr.	1550 fps	Henry Big Boy	Lever
.45 Long Colt	255 gr.	1100 fps	Uberti Model 1866	Lever

MEDIUM-LIGHT RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
.243 Win.	80 gr.	3350 fps	Browning 1885 Low Wall	Falling Block
.243 Win.	95 gr.	3100 fps	Browning 1885 Low Wall	Falling Block
.243 Win.	100 gr.	2960 fps	Browning A-Bolt Hunter	Bolt
6mm Rem.	100 gr.	3100 fps	Ruger No. 1B	Falling Block
.25-35 Win.	117 gr.	2230 fps	Win. Model 94	Lever
.257 Roberts	117 gr.	2650 fps	Ruger No. 1A	Falling Block
.257 Roberts +P	117 gr.	2780 fps	Ruger No. 1A	Falling Block
6.5x54 M-S	140 gr.	2400 fps	Greek Military M-S	Bolt
6.5x54 M-S	160 gr.	2240 fps	Greek Military M-S	Bolt
.260 Rem. (MR)	140 gr.	2300 fps	Rem. Model 700 CDL SF	Bolt

Cartridge	Bullet Wt.	MV	Test Rifle	Action
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6.8mm Rem. SPC	115 gr.	2526 fps	Ruger Ranch Rifle	Autoloading
.270 Win. (MR)	115 gr.	2710 fps	Ruger No. 1B	Falling Block
7mm-08 Rem. (MR)	140 gr.	2300 fps	Rem. Model 700 CDL	Bolt
.30-30 Win. (MR)	125 gr.	2175 fps	Marlin 336SS	Lever
.308 Win. (MR)	125 gr.	2660 fps	Ruger M77RSI	Bolt
.30-06 Spfd. (MR)	125 gr.	2660 fps	Rem. Model 798	Bolt
7.62x39 Soviet	123gr.	2365 fps	Ruger Mini-30	Autoloading

MEDIUM RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
.240 Wby. Mag.	100 gr.	3406 fps	Wby. Mark V Deluxe	Bolt
6.5x55 SE	140 gr.	2550 fps	Win. Model 70 Featherweight	Bolt
6.5x55 SE	140 gr.	2650 fps	Swedish Military M96 Mauser	Bolt
6.5x55 SE	140 gr.	2720 fps	Ruger No. 1A	Falling Block
.260 Rem.	120 gr.	2890 fps	Rem. Model 700 Mountain LSS	Bolt
.260 Rem.	140 gr.	2750 fps	Rem. Model 700 CDL SF	Bolt
6.5mm-284 Norma	140 gr.	2850 fps	Savage Model 12 F-Class	Bolt
6.5mm Rem. Mag.	120 gr.	3210 fps	Rem. Model 673	Bolt
7x57 Mauser	139 gr.	2700 fps	Custom Mauser 98	Bolt
7mm-08 Rem.	140 gr.	2860	Rem. Model 700 CDL	Bolt

Cartridge	Bullet Wt.	MV	Test Rifle	Action
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		fps		
7mm Rem. Mag. (MR)	140 gr.	2710 fps	Wby. Vanguard Deluxe	Bolt
.30-30 Win.	150 gr.	2390 fps	Win. Model 94	Lever
.30-30 Win.	160 gr.	2400 fps	Marlin Model 336XLR	Lever
.30-30 Win.	170 gr.	2200 fps	Marlin 336SS	Lever
.308 Marlin Express	160 gr.	2660 fps	Marlin Model 308MXLR	Lever
.30-06 Spfd.	180 gr.	2700 fps	Merkel SR1	Autoloading
.32 Win. Spec.	170 gr.	2250 fps	Win. Model 94	Lever
8x57 Mauser	170 gr.	2360 fps	Military Mauser 98	Bolt
.35 Rem.	200 gr.	2080 fps	Marlin Model 336T	Lever
.44 Rem. Mag.	240 gr.	1760 fps	Browning Model 1892	Lever

MEDIUM-HEAVY RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
.257 Wby. Mag.	100 gr.	3602 fps	Wby. Mark V Deluxe	Bolt
.257 Wby. Mag.	120 gr.	3305 fps	Wby. Mark V Deluxe	Bolt
.264 Win. Mag.	140 gr.	3100 fps	Win. Model 70 Westerner	Bolt
.270 Win.	130 gr.	3100 fps	Win. Model 70 Standard	Bolt
.270 Win.	140 gr.	2950 fps	Ruger No. 1B	Falling Block
.270 Win.	150 gr.	2850 fps	Win. Model 70 Standard	Bolt

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.270 Wby. Mag.	130 gr.	3375 fps	Wby. Mark V Deluxe	Bolt
.270 Wby. Mag.	150 gr.	3245 fps	Wby. Mark V Deluxe	Bolt
7mm-08 Rem.	140 gr.	2860 fps	Merkel K3 Carbine	Break-Open
7mm-08 Rem.	150 gr.	2650 fps	Merkel K3 Carbine	Break-Open
7mm Rem. Mag.	140 gr.	3175 fps	Wby. Vanguard Deluxe	Bolt
7mm Rem. Mag.	150 gr.	3110 fps	Wby. Vanguard Deluxe	Bolt
7mm Rem. Mag.	160 gr.	2950 fps	Wby. Vanguard Deluxe	Bolt
7mm Wby. Mag.	140 gr.	3303 fps	Wby. Mark V Deluxe	Bolt
.308 Win.	147 gr.	2800 fps	Browning X-Bolt Hunter	Bolt
.308 Win.	150 gr.	2820 fps	Ruger M77RSI	Bolt
.308 Win.	165 gr.	2700 fps	M-S 1961-MCA	Bolt
.308 Win.	180 gr.	2620 fps	T/C Icon	Bolt
.30-06 Spfd.	147 gr.	2800 fps	U.S. M1 Garand	Autoloading
.30-06 Spfd.	150 gr.	2910 fps	Rem. Model 700 BDL	Bolt
.30-06 Spfd.	165 gr.	2800 fps	Win. Model 70 Super	Bolt
.30-06 Spfd.	180 gr.	2700 fps	Rem. Model 798	Bolt
.303 British	174 gr.	2475 fps	Lee-Enfield Sporter	Bolt
.303 British	180 gr.	2460 fps	Lee-Enfield Sporter	Bolt
8x57JS Mauser	150 gr.	2900 fps	Military Mauser 98	Bolt
.338 Marlin Express	200 gr.	2565 fps	Marlin Model 338MXLR	Lever
.338 Federal	185 gr.	2750 fps	Sako 85 Hunter	Bolt
.338 Federal	210 gr.	2630 fps	Sako 85 Hunter	Bolt
.338 Win. Mag.	200 gr.	2960 fps	Browning BAR Safari Grade	Autoloading
.338 Win. Mag.	225 gr.	2780 fps	Browning BAR Safari Grade	Autoloading
.358 Win.	200 gr.	2490 fps	Browning BLR	Lever
.358 Win.	220 gr.	2300 fps	Browning BLR	Lever
.444 Marlin	240 gr.	2350 fps	Marlin Model 444	Lever
.444 Marlin	265 gr.	2325 fps	Marlin Model 444	Lever
.45-70 Govt.	300 gr.	1810 fps	Marlin Model 1895	Lever
.45-70 Govt.	300 gr.	1810 fps	Browning 1885 High Wall	Falling Block

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.45-70 Govt.	405 gr.	1330 fps	Browning 1885 High Wall	Falling Block
.458 Win. Mag.	400 gr.	1400 fps	FN/Browning Safari Grade	Bolt

HEAVY RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
7mm Wby. Mag.	154 gr.	3260 fps	Wby. Mark V Deluxe	Bolt
7mm Wby. Mag.	160 gr.	3200 fps	Wby. Mark V Deluxe	Bolt
.300 WSM	150 gr.	3320 fps	Kimber 8400 Montana	Bolt
.300 WSM	180 gr.	3010 fps	Kimber 8400 Montana	Bolt
.300 Win. Mag.	180 gr.	2970 fps	Win. Model 70 Classic	Bolt
.338 Federal	210 gr.	2630 fps	Kimber Model 84M Classic	Bolt
.35 Whelen	250 gr.	2400 fps	Rem. Model 700 BDL	Bolt
.350 Rem. Mag.	200 gr.	2775 fps	Rem. Model 673	Bolt
.350 Rem. Mag.	225 gr.	2550 fps	Ruger M77R	Bolt
.350 Rem. Mag.	250 gr.	2500 fps	Rem. Model 673	Bolt

VERY HEAVY RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
.338 Win. Mag.	225 gr.	2780 fps	Win. Model 70 Classic	Bolt
.338 Win. Mag.	250 gr.	2660 fps	Win. Model 70 Classic	Bolt
9.3x74R	286 gr.	2360 fps	Ruger No. 1S	Falling Block
.450 Marlin	350 gr.	2000 fps	Marlin Model 1895M	Lever
.45-70 Govt.	350 gr.	2100 fps	Browning 1885 High Wall	Falling Block
.45-70 Govt.	500 gr.	1700 fps	Browning 1885 High Wall	Falling Block
.458 Win. Mag.	350 gr.	2100 fps	FN/Browning Safari Grade	Bolt
.458 Win. Mag.	400 gr.	2050 fps	FN/Browning Safari Grade	Bolt

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EXTREME RECOIL

Cartridge	Bullet Wt.	MV	Test Rifle	Action
.416 Rigby	400 gr.	2400 fps	Ruger M77RSM	Bolt
.458 Win. Mag.	500 gr.	2040 fps	FN/Browning Safari Grade	Bolt