

Expanded Shotgun 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 shotgun's reaction will exactly equal the momentum of the wad, shot 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 this recoil table.

Do not forget that gun weight is a crucial factor in the recoil equation, inversely proportional to recoil. Increase the gun weight by, say, 25% and the recoil goes down by 25%. In the real world, firearms chambered for smaller cartridges are typically built lighter than firearms chambered for more powerful cartridges. That can result in a dramatic increase in kick when, for example, 3", 1-1/4 ounce Magnum shells are fired in a 20 gauge upland gun appropriate for use with 2-3/4", 7/8 ounce loads. Choose a gun weight appropriate for the loads you intend to shoot.

However, perceived recoil, what the shooter feels, is a highly subjective matter. It is influenced by many factors. One of the most important of these, in addition to gun weight, is the fit and shape of the gun stock. 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. These sorts of things cannot be accounted for in a recoil table. Also, please understand that there are dozens of loads for any given payload weight in a given gauge that will produce the same velocity, but a different amount of recoil. Therefore, the figures in any recoil table should be taken as approximate. Never-the-less, the table below should give a reasonably accurate comparison of the recoil of most popular shotgun gauges/shells.

It is worth remembering that the majority of authorities agree that recoil of over twenty foot pounds will cause most shooters to develop a serious flinch, which is ruinous to good shooting. Fifteen foot pounds is probably about the maximum recoil energy most shooters feel reasonably comfortable with, particularly at the trap or skeet range, where most serious shotgun practice occurs.

While recoil energy determines how hard the blow to the shoulder feels, recoil velocity determines how abrupt the blow to the shoulder 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.

I estimate that fifteen foot pounds of free recoil energy and 10 fps of recoil velocity represent the approximate upper limit of the comfort level. Above that recoil becomes increasingly intrusive and performance degrading. Also, the effects of recoil are cumulative. The longer you shoot, and the harder the gun kicks, the more likely you are to flinch. These are good things to remember when comparing shotgun gauges and loads.

The following recoil figures are taken from various sources including the recoil nomograph in the *Handloader's Digest 8th Edition*, the online recoil calculator at Big Game Info (<http://www.biggameinfo.com/RecoilCalc.asp>), the Remington Shoot! program or calculated from the formula given in the *Lyman Reloading Handbook, 43rd Edition*.

Gauge, length (oz. shot@MV)	Gun weight (lbs.)	Recoil energy (ft. lbs.)
.410 bore, 2.5" (1/2 at 1200)	5.5	7.1
.410 bore, 2.5" (1/2 at 1200)	7.3	4.8
.410 bore, 3" (11/16 at 1135)	5.5	10.5
.410 bore, 3" (11/16 at 1135)	6.0	9.6
28 gauge, 2.75" (3/4 at 1200)	6.0	12.8
28 gauge, 2.75" (3/4 at 1200)	6.5	11.8
20 gauge, 2.75" (7/8 at 1155)	6.5	14.4
20 gauge, 2.75" (7/8 at 1200)	6.5	16.1
20 gauge, 2.75" (7/8 at 1200)	7.0	14.8
20 gauge, 2.75" (1 at 1165)	6.5	19.0
20 gauge, 2.75" (1 at 1220)	6.5	21.0
20 gauge, 2.75" (1-1/8 at 1175)	6.5	25.0
20 gauge, 3" (1-1/4 at 1185)	6.5	31.0
16 gauge, 2.75" (1 at 1220)	7.0	21.5
16 gauge, 2.75" (1-1/8 at 1185)	6.5	24.0
16 gauge, 2.75" (1-1/8 at 1240)	7.0	27.6
12 gauge, 2.75" (1 at 1125)	7.5	15.8
12 gauge, 2.75" (1 at 1180)	7.5	17.3
12 gauge, 2.75" (1 at 1290)	7.5	20.8
12 gauge, 2.75" (1-1/8 at 1145)	7.5	19.8
12 gauge, 2.75" (1-1/8 at 1145)	8.0	18.5
12 gauge, 2.75" (1-1/8 at 1220)	7.5	23.0
12 gauge, 2.75" (1-1/4 at 1220)	7.5	26.0
12 gauge, 2.75" (1-1/4 at 1330)	7.5	32.0
12 gauge, 2.75" (1-1/2 at 1260)	7.5	45.0
12 gauge, 3" (1-5/8 at 1280)	7.5	52.0
12 gauge, 3" (1-7/8 at 1210)	7.5	60.1
12 gauge, 3" (1-7/8 at 1210)	8.0	55.9
12 gauge, 3" (1-7/8 at 1210)	8.75	54.0
10 gauge, 3.5" (2-1/4 at 1210)	10.5	62.9