John Haviland

Brass Prep for Hunters

I like to weigh, trim and measure cartridge cases because this fiddling keeps me out of malls and off golf courses. But I wondered if this obsessive attention actually wasted time that would be better spent shooting, so I was determined to see if all the fussing really improves the accuracy of my hunting handloads.

I started the project with 40 once-fired cases apiece for a garden-variety Mark X Mauser .30-06, used to hunt deer and elk, and a very accurate Cooper Firearms Model 22 .22-250 Remington, employed for marmot and coyote hunting. The cases were sorted and weighed then separated into two batches: 15 each for prep work and 15 left as-is to act as a control to determine if all the work that went into improving cases was worth it.

Weights and Measures

A uniform weight purportedly ensures the cases have a uniform wall thickness and internal volume. Several articles on precision reloading state variations in body wall thickness can lead to cartridges lying differently in the chamber, causing them to expand differently when fired. I always thought cases had the same external dimensions after they were fired and also after they were sized. To be sure, I compared the diameter in front of the extractor groove and at the shoulder of Hornady .30-06 cases that varied up to nearly four grains in weight. There was next to no difference.

Forty of the .30-06 cases varied in weight from 169.7 to 173.5 grains. Most, though, weighed close to 171 grains. I set aside 15 that weighed between 171.0 to 171.4 grains for further refinement. I took another 15 from the remaining cases without bothering to weigh them.

Forty Winchester nickel-plated .22-250 Remington cases varied in weight from 157.5 to 160.4 grains. I picked out 15 that weighed from 158.0 to 158.6 grains, and another 15 were taken at random from the remaining cases.

Segregating cases by weight ensures a batch of them has the same internal dimensions. Today's cases are so uniform, however, that weighing them is a waste of time for hunters.

To make the .22-250 and .30-06 cases of uniform weight as identical as possible, I trued their flash holes, primer pockets and necks. According to prevailing advice, a burr is often formed inside the primer pocket flash hole when the flash hole is punched during case manufacturing. This rough edge on the inside of a flash hole can deflect the primer flame from getting a straight shot at the powder and cause the powder to start burning unevenly. To remove any burrs that might exist around the flash holes and make all the holes the same size, I used a Redding Flash Hole Deburring Tool, which has a stop that allows the cutting head to trim away only a determined amount of brass. After giving the tool handle a few turns it stopped cutting, and only a few flecks of shaved brass came out of the case.

I sawed the heads off .22-250 Remington and .30-06 cases, each having original flash holes and ones

Handloads built on ordinary .30-06 cases and trued cases resulted in no significant accuracy difference.

with trued flash holes. The original flash holes did not have any burrs, just nice, even circumferences. The deburring tool cut a tiny bevel on the inside of the holes.

Additional advice indicates that primer pockets that vary in depth and are not square on their faces can cause variations in primer seating. This can alter the effect of the rifle's firing pin strike and cause primer ignition and subsequent powder ignition to fluctuate. That sounds plausible, so I trued the primer pockets of 15 .22-250 and 15 .30-06 cases with a Redding Primer Pocket Uniformer.

The .22-250 case primer pockets had a slight dish-shaped center. The uniformer only slightly cut the outside edge of the pockets. It did not deepen the pockets, and the dished centers remained untouched. I wondered if that concave face might be an advantage, allowing the primer flame to funnel toward the flash hole. Primer pockets in the Hornady .30-06 cases varied some in depth. The uniformer barely cut the outside edge and scraped the face of some pockets while on others it cut the whole face deeper.

More wisdom indicates that variations in neck wall thickness cause misalignment of the loaded round in the chamber and the bullet with the rifle's bore. Differences in neck thickness also result in varied tension on the bullets, producing differing pressures and velocities. Most of the 15 .22-250 Remington brass varied by .001 inch of neck thickness. A few, though, varied .002 inch. The Hornady .30-06 cases were beautiful with only a few varying ever so slightly more than .001 inch. To uniform the necks, a Forster neck turner peeled off a minimal amount of brass from one side of the necks.

Shooting Results

Once loaded, all the cartridges were run through a Hornady concentricity tool to check bullet runout and, if needed, the bullets were straightened to within .002 inch of the centerline of the case. The plan was to shoot three, five-shot groups at 100 yards with each of the loads to determine if the worked-over cases provided better precision and more uniform velocities.

The temperature was 15 degrees the morning I shot the loads, however; and after firing three shots, the heat rising from the barrels, especially the .30-06, distorted the view through the scopes to the point the target squares looked like they were dancing. So I went with five, three-shot groups instead and let the barrels cool completely between groups.

As the Case Prep Comparisons table shows, all the work that went into truing the .30-06 cases resulted in .12-inch tighter groups at 100 yards for 15 shots as compared to the loads in unprepped brass. That's nothing, especially for a rifle with a 4x scope. Consistent primer pockets and flash holes also failed to provide more even primer and subsequent powder ignition. In fact, the plain .30-06 cases had a slightly lower extreme velocity spread of 36 fps over nine shots compared to the trued cases' 39 fps. Again, nothing.

Prepared cases did improve the performance of the .22-250 Remington – if a minuscule .028 inch tighter groups for 15 shots and 9 fps less extreme velocity spread for nine shots is considered a step up.

Accuracy advantages could well have gone to the plain cases depending on the rifle operator's skill.

In the end, the case preparation resulted in nothing. This will hopefully cure my compulsion to fiddle, and I'll spend less time in the basement gloom at the loading bench and more outside shooting in the healing sunlight.

A primer pocket cutting tool scraped some brass off the face of primer pockets in Hornady .30-06 cases.

Case necks vary little in thickness. Uniforming them by trimming **(right)** resulted in no accuracy gains over a standard case **(left)**.

Case Prep Comparisons

bullet *(grains)*	powder	charge *(grains)*	velocity *(fps)*	extreme spread *(fps)*	group *(inches)*
Cooper Model 22 .22-250 Remington, Sightron SII 4-16x 42mm scope set on 16x					
52 Berger FB Target	Varget	36.0			
trued cases			3,527	23	.550
plain cases			3,530	32	.578
Mark X Mauser .30-06, Weaver 4x scope					
165 Nosler Ballistic Tip	IMR-4350	56.0			
trued cases			2,553	39	1.60
plain cases			2,576	36	1.72

Notes: Extreme spread and group size represent the average for five, three-shot groups. All groups fired off a bench at 100 yards.

Be Alert: Publisher is not responsible for errors in published load data.