

fire reduced loads in these cases, from this point forward, and never fire maximum loads in these cases, and don't polish them, let case lube get on them, or otherwise do anything that may make them slip around in the chamber. Really want all that?

The cartridge case is weaker after case head squaring, no getting around that. The combination of excessive stretching to make up the headspace and thinning the web to provide adequate primer pocket depth have probably done as much damage as the squaring may have improved.

To evaluate the intent of case head squaring, though, requires taking a look at what contributes or detracts from a square case head prior to (or after) tool working it. First was the already gone over case wall unevenness. The only solution (partial at best) to that is selecting good cases, and that selection starts with purchase. Some of the European stuff is better (matter of fact, many Norma® cases already have milled case heads). Elsewhere I say that it's hard to always justify spending the extra, but now we're into this one specific point where consistency of wall thicknesses is that important (for purposes of this little ditty).

When a case is first fired (fire formed), the case head gets slammed back against the bolt face. This, as said, is more than adequate to square a case head — provided that it's been driven back squarely to a square surface.

Along this same line of thinking, if someone sees that case head squaring is obviously necessary (not the process, but the need, no confusion), and especially if the runout measurements are 0.005-plus inches, then there's probably problems no amount of brass shaving will correct. Namely, misalignment in the action or "bad" brass. If the case head was squared but the bolt face was not, then he's probably spent a lot of time to get back to what he already had. Hammering a nail head off center or at an angle can bend the nail, and the same thing can happen to a case during firing.

Other contributors to case warp can't much

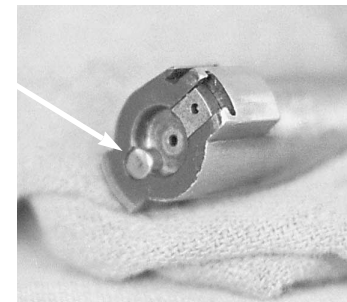
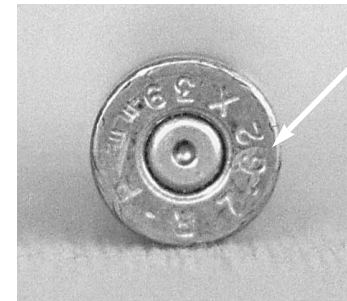
be done about. Any across the course rifle has to have an ejector to function. An ejector is a little spring loaded plunger (usually) that pushes against one edge of the case head and functions to get a spent case pointed out of the action. A fed rifle won't function without one. For any of what has been said to this point about square bolt faces squaring cartridge case heads to be "true" the rifle can't have an ejector.

The ejector is always pushing against the outside edge of the cartridge case. To see the effect, just look when extracting a round, loaded or spent. It's pretty hard to figure how a case can avoid being warped (even a "perfect" case in a "perfect" action) with this constant needling from the ejector. Probably can't. Reducing ejector pressure is an experiment worth trying, but the first step in running that test is to get a baggie full of ejector springs. I like for my rifles (and, by the way, I'm talking here about making this modification on bolt actions, not semi-automatics) to be able to kick out a loaded round, but some think dispensing spent cases is plenty enough power. I can see that. Reducing ejector pressure is a worthwhile pursuit but under no circumstance cut off the spring to spite the case: gun has to work.

[Another (very) important note on ejector modifications: spring fiddling sometimes is necessary to make the rifle feed its rounds right, not just eject cases. Understand that reducing ejector pressure may result in a rifle not feeding thataway, and also understand that the gunsmith may have already carefully tweaked this relationship that we are about to tear asunder.]

There may be marks on the case head that footprint the effect of the ejector, and sometimes extractor. These were caused by pressure driving the case head back hard into the bolt face. Given that, there's a logical question of why ejector pressure matters, and the answer is in milliseconds, and less: there's enough "time" for the influence of this pressure to promote unequal case stretch. Extractor fit is another influence, but that should be what it should be, and there shouldn't be any-

*Here's a footprint left by an ejector (circular indentation on the right edge of the base). I say footprint because it's a kick and a half (usually a "pressure sign"). With the ejector always pushing against the case head it's a pretty tall order to expect there to be no lasting influence with respect to case head squareness.*



*Here's what an ejector is and here's what an ejector does. Has to happen. Cutting down the spring under the ejector can help (may help, only certainty is that it makes its influence and function weaker).*



thing keeping the case from fitting flush against the bolt face.

The ejector can be dispensed with entirely on a single shot, and that's a good idea. The shooter will have to pluck each case himself but that's not unduly bothersome.

On a more upbeat note: given that all cases in across the course rifles will eventually warp, which is an easy and descriptive way of saying various elements become misaligned, it's not much trick to account for it: find the high spot (thin side) and mark it. Use a tick mark done with a needle file. The case must be spun in a concentricity fixture to determine this point. Single shot cases will also warp unless body wall thicknesses are dead same everywhere.

For what it's worth, case "warp" can be in different areas and from different causes, but, again, that doesn't matter. Okay, say it does: a "warped case" can have its head cocked so the body leans, its head and mouth out of alignment,

its head and mouth in alignment but with a curved body between the two, or a combination (usually) of all these problems.

Either way, some shooters rely on (re)placing the cases into the chamber with these marks pointing the same way. This probably doesn't (shouldn't at least) offset any effects of the warp but stands to reason that it's an extra measure of consistency. I don't know that it matters how the mark is oriented, but placing it down at six o'clock is a little more precise since it can be centered on the loading ramp.

I have experimented with setting the marked side (which is the thin side) over the ejector to see if there was any net difference in case warpage, which ostensibly was hoped to be an improvement. Didn't really see it. It was a thought, though, and the thinking was that the thicker side would get the "free run" at the bolt face during firing. On this topic, checking up: if this is an area that concerns anyone, keep up with what's hap-