# How to Adjust Reloading Dies

**By Chuck Hawks**

The first (and obvious) way to learn how to adjust a new set of reloading dies is to read the instructions that come with the dies. If for some reason you didn't get instructions with your set of dies (you purchased used dies, for example), read on.

This article assumes that you are using RCBS dies, but other die sets are generally similar. Essentially I am going to paraphrase the instruction sheet that comes with RCBS dies, with a tip or two based on my 40 years as a reloader thrown in. The RCBS instruction sheet covers everything you need to know, and RCBS deserves kudos for this. Thank you, RCBS!

First of all, it is important to understand what a set of reloading dies does. Here are the operations accomplished by any set of reloading dies:

- decapping (remove the spent primer)
- resize the case back to its original dimensions
- expand the case mouth to accept a new bullet
- seat the new bullet in the case

Bottleneck cartridges, which include the great majority of rifle cartridges and a few pistol cartridges, are generally reloaded using a set of two dies. The .308 Winchester is an example of a typical bottleneck cartridge. These two dies are a resizing/decapping/expanding die, and a bullet seating die.

Straight-wall pistol and rifle cartridges are typically reloaded with a set of three dies. The .357 Magnum is an example of a typical straight-wall cartridge. Three die sets include a resizing/decapping die, an expanding die, and a bullet seating die. This is because it is impossible to resize *and* expand the mouth of a straight-wall case at the same time.

TWO DIE SETS

Two die sets come with a die that decaps, resizes and expands the mouth of a bottleneck case so that it is ready to accept a new bullet in one operation. The second die is used to seat a new bullet in the case in a separate operation. Both of these dies must be correctly adjusted to produce a properly reloaded cartridge.

**Adjusting the resizing die**

The end of the decapping pin must protrude at least 3/16" below the bottom of the die to remove the spent primer. When properly adjusted, the internal expander

ball/decapping pin unit will just punch out the spent primer. Loosen the small lock nut at the top of the die and turn the expander/decapping unit in or out until the proper adjustment is achieved. Do not set the decapping pin so that it protrudes any more than necessary, as this reduces the case necks grip on the new bullet.

Having adjusted the decapping pin to the correct position, it is now necessary to adjust the resizing die to either full length or neck size the case. Just resizing the neck case extends the life of the brass and is satisfactory if the reloaded cases will be fired again in the same rifle. If you only own one firearm for a given caliber, and it is a strong single shot or bolt action model, neck sizing is generally preferred.

Full length resizing works the brass more than neck sizing. But it is usually necessary if the finished cartridges are to be fired in more than one rifle, or if they were not fired in the same rifle in the first place, or if you are reloading virgin (unfired) brass. Cases fired in guns with lever, pump, and autoloading actions typically stretch more than cases fired in bolt and single shot actions, and usually require full length resizing. Most shooters full length resize belted magnum cases. It is also a good idea to full length resize cases that might be used to shoot dangerous game, as full length resized cases are less likely to cause a feeding problem at a critical moment. If in doubt, my advice is to full length resize.

Here is how to adjust the resizing die to full length resize cases. First, run the ram to the top of the reloading press stroke with the proper shell holder installed. Second, screw the resizing die into the press until it stops against the elevated shell holder. Third, all play must be removed from the system. To do this, lower the ram and turn the die 1/8 to 1/4 turn farther into the press. Check the adjustment by returning the shell holder to the top of its stroke--you should feel the press cam over center. Now set the large lock ring and your die is adjusted to properly full length resize cases.

The first two steps of the die adjustment procedure for neck sizing are identical, but the third step is to back the die slightly out of the press. You must check the adjustment for neck sizing by running a fired case into the press. You should be able to see how far down the neck of the case is being resized. The die is properly adjusted for neck sizing when the neck has been resized but the shoulder is not set back. Then tighten the large lock ring.

**Adjusting the bullet seating die**

Most bottleneck cases do not require crimping. The tension of the case mouth will usually hold the bullet properly in place without crimping the mouth of the case into the bullet. Bullet crimping works the mouth of the case excessively, and shortens case life. It also requires a bullet with a cannelure into which the case mouth is crimped. *Do not* attempt to crimp a bullet without a cannelure. I will discuss bullet crimping in

connection with three-die sets, as most revolver bullets are crimped in place, and the procedure is the same.

Here is how to seat a bullet into the case without crimping. First, place a prepared case (a case that has been resized, re-primed and contains the proper amount of powder) into the shell holder and run it to the top of the press stroke. Second, screw the bullet seating die into the press until you feel it touch the case. Third, back the die off one turn and set the large lock ring. Now there is a proper gap between the shell holder and the die.

The next procedure is adjusting the seater plug inside the die so that it seats the bullet to the proper depth in the case. This depends on the particular bullet you are using, the length of your rifle's magazine (the reloaded cartridges must fit into the magazine), the length of your rifle's chamber throat (the bullet must not touch the rifling when chambered), and whether the reloaded cartridges are to be fired in more than one model of rifle (since these dimensions may differ). The safest procedure is to set the bullet to the cartridge overall length (COL) specified in your reloading manual. To do that will require a caliper to measure the length of the finished cartridge. If you don't have a caliper, I suggest that you purchase one wherever you buy reloading accessories. It is a handy thing to have.

If you have a factory loaded cartridge handy, the process can be simplified. First, loosen the seater plug lock nut and back the bullet seater plug as far out as possible. Second, place the factory load into the shell holder and run it all the way into the seater die. Third, screw the seater plug down into the seater die until you feel it stop against the bullet in the factory load. Tighten the seater plug lock nut. If you are reloading the same bullet as the factory load uses, your seater die is properly adjusted.

Even if you are not using the same bullet as the factory load, the adjustment of the seater die should at least be in the ballpark. Use your caliper to measure the overall length of the reloaded cartridge, and refine the adjustment of the seater plug so that the bullet you are using is seated to the cartridge overall length specified in your reloading manual. Remember to tighten the seater plug lock nut when you are finished.

If you do not have a factory load to use as a baseline, here is how to adjust the seater plug. Insert a bullet into the mouth of a prepared case and carefully run the case into the seater die with the bullet seater plug adjusted to whatever depth it came from the factory. You will feel the bullet contact the seater die and be pushed a little way into the case. Stop there. Withdraw the case from the seater die and note how far the bullet protrudes from the case. It is probably sticking out too far. Slowly run the case back

into the seating die and gently seat the bullet a *little* deeper. (Screw the seater plug farther into the die if necessary, but it probably won't be.) Use a caliper to measure the cartridge overall length. Repeat this step until the bullet is seated to the correct overall length as specified by your reloading manual. This is now our sample cartridge.

Then withdraw the sample cartridge with its correctly seated bullet all the way to the bottom of the press stroke. Loosen the seater plug lock nut and back the seater plug all the way off. Run the sample cartridge all the way into the seater die (the top of the press stroke). Turn the seater plug into the seater die until it makes firm contact with the bullet in your sample cartridge. Tighten the seater plug lock nut; your seater die should now be correctly adjusted.

There is one final step, however. Take the newly reloaded cartridge and make sure that it chambers correctly in your rifle. (Keep the gun pointed in a safe direction and do this with the safety "on" if possible.) Insert it into the magazine to insure that it fits and feeds correctly. It should, but if it doesn't, refine the adjustment of the seater plug in the seater die until it does. Even if you didn't use a caliper to set the bullet to the correct COL and adjusted the bullet seater plug simply by trial and error, when the reloaded cartridge chambers and feeds correctly in your rifle, your bullet seating die is correctly adjusted.

## THREE DIE SETS

Straight wall pistol and rifle cases require a three die set. The first die resizes and decaps the case. The second die expands (bells) the case mouth to accept a new bullet, and the third die seats (and, if desired, crimps) the bullet. These dies must be correctly adjusted to produce a proper reload.

### Adjusting the resizing die

Some three die sets for reloading pistol cartridges are available with a tungsten carbide insert in the resizing die. These more expensive resizing/decapping dies do not generally require case lubricant for the resizing operation. They are used and adjusted just like a regular die, except that they should be adjusted in the press so that the shell holder does not strike the bottom of the die. Screw a carbide resizing die into the press with the shell holder at the top of the stroke. When the die touches the shell holder, stop and tighten the large lock nut. *Do not* screw a carbide die so far into the press that it cams over at the top of the stroke.

Whether the resizing die is carbide or the standard steel type, the decapping pin should be adjusted so that is protrudes 3/16" below the bottom of the die. Loosen the small lock nut at the top of the die and turn the decap assembly in or out to achieve

approximately 3/16" of protrusion, and tighten the lock nut. Make sure the decapping pin is still centered in the die after the lock nut has been tightened.

**Adjusting the expander die**

First, run the shell holder to the top of its stroke, then screw the expander die into the press until it touches the shell holder and tighten the large lock ring. Lower the shell holder, place a resized case in the shell holder, and run it fully into the expander die. Check the mouth of the case. It should be expanded and belled just enough to accept a new bullet. Excessive belling of the mouth shortens case life. If the case needs more or less expansion, loosen the lock nut at the top of the die and screw the tapered expander plug up or down until the correct amount of belling at the mouth of the case is achieved, then re-tighten the lock nut.

**Adjusting a roll crimp bullet seating die**

Most revolver cartridges require a roll crimp to hold the bullet in place during recoil. Bullets intended to be roll crimped *must* have a crimping cannelure (a crimping groove). Do not attempt to roll crimp bullets without a cannelure.

Also, make sure that your resized cases are all the same length. If they are not, trim the cases to the overall length specified in your reloading manual. For consistent roll crimping the cases must all be the same length.

The crimping feature is machined into the seating die and the amount of crimp is determined by how far the die is screwed into the press. For seating bullets *without* crimping, adjust the bullet seating die as per the instructions (above) under TWO DIE SETS.

For bullet seating *with* a roll crimp, adjust the seating die as follows. First, place a prepared (resized, primed and powder-charged) case into the shell holder and run it to the top of the ram stroke. Second, screw the seating die into the press until you feel it touch the case. Third, back off the seating die one full turn and set the large lock ring.

Lower the prepared case and place a bullet in the case mouth. Run the case with bullet slowly into the die, stopping frequently to check the bullet seating depth as the bullet is pushed into the case. Adjust the seater plug up or down so that, at the top of the press stroke, the bullet is seated into the case so that the case mouth is even with the middle of the bullet's crimping cannelure.

The next step is to adjust the die to crimp. With the uncrimped cartridge still in the seater die, back off the bullet seater plug several turns. Next, loosen the large lock ring and screw the body of the seater die into the press until you feel it touch the mouth of the case. Lower the uncrimped cartridge and turn the seater die down approximately 1/8 turn. Run the prepared cartridge fully into the seater die and check

the crimp. The bullet should be held securely. Setting the seater die too far into the press will excessively crimp the case and may cause a bulge in the body of the case. Refine the adjustment of the seater die until you are satisfied with the amount of crimp, and then tighten the large lock ring.

The last step is to run a perfectly crimped cartridge all the way into the seater die. Then turn the bullet seater plug back down until it touches the bullet. Tighten the seater plug lock nut. You bullet seating die is now correctly adjusted and will seat and crimp bullets with a single stroke of the press.

**Adjusting a taper crimp bullet seating die**

Cartridges for autoloading pistols are generally taper crimped. This is necessary because such cartridges headspace on the case mouth, so a roll crimp cannot be used. Taper crimp bullet seating dies are specially marked. RCBS marks theirs "TC" for easy identification.

The taper crimping feature is machined into the die and the amount of crimp is determined by how far the seating die is screwed into the press. Cases to be taper crimped must all be the same length, but bullets do not require a crimping cannelure.

The initial adjustment process is the same as described above in the roll crimp section. First, place a prepared (resized, primed and powder-charged) case into the shell holder and run it to the top of the ram stroke. Second, screw the seating die into the press until you feel it touch the case. Third, back off the seating die one full turn and set the large lock ring.

Lower the prepared case and place a bullet in the case mouth. Run the case with bullet slowly into the die, stopping frequently to check the bullet seating depth as the bullet is pushed into the case. Adjust the seater plug up or down so that, at the top of the press stroke, the bullet is seated to the correct cartridge overall length as specified in your reloading manual.

The next step is to adjust the die to crimp. With the uncrimped cartridge still in the seater die, back off the bullet seater plug several turns. Then loosen the large lock ring and screw the body of the seater die into the press until you feel it touch the mouth of the case. Lower the uncrimped cartridge and turn the seater die down approximately 1/8 turn. Run the prepared cartridge fully into the seater die and check the crimp. The bullet should be held securely. Refine the adjustment of the seater die until you are satisfied with the amount of crimp, and then tighten the large lock ring.

The last step is to run a perfectly crimped cartridge all the way into the seater die. Then turn the bullet seater plug back down until it touches the bullet. Tighten the

seater plug lock nut. You bullet seating die is now correctly adjusted and will seat and taper crimp bullets with a single stroke off the press.