

Basic Rod Prep

DSS shows where you can help on connecting rod prep

text and photography by Tom Wilson

Caught between the reciprocating piston and the rotating crankshaft, no other engine part works as hard as the connecting rod. Removing the rough surfaces and sharp edges where cracks start is an important part of preparing rods for heavy-duty use.

Have you ever wondered what goes on behind the counter at a machine shop? On a trip to DSS Inc., we were treated to a look behind the scenes at their Boss 429 Pro Stock Probe familiar to Midwest drag racing fans, and along the way saw their machine shop operations. The awesome Probe is another story, but right now we'd like to illustrate some basic connecting rod preparation courtesy of DSS. As you'll see, there isn't much mystery in the procedures, some of which you can easily do at home to save a few bucks.

What DSS showed us were the steps needed to get the average Ford connecting rod into shape for street and strip duty. The strategy is to smooth and harden the outside of the rod for strength, then machine the pin and crankshaft ends to the correct size. Finally, the notoriously undersized small-block Ford rod bolts are updated.

All non-Boss small-block rods use tiny 5/16-inch rod bolts, which positively need upgrading. FE Le Mans rods have criminally weak stock rod bolts, and also require updating. The best way to do this is to use super-duty hardware; DSS uses ARP bolts. Do not drill standard small-block rods to the Boss 302 3/8-inch size or you'll weaken the rod. All other Ford V-8 rods have adequate size rod bolts, but could use high-grade hardware.

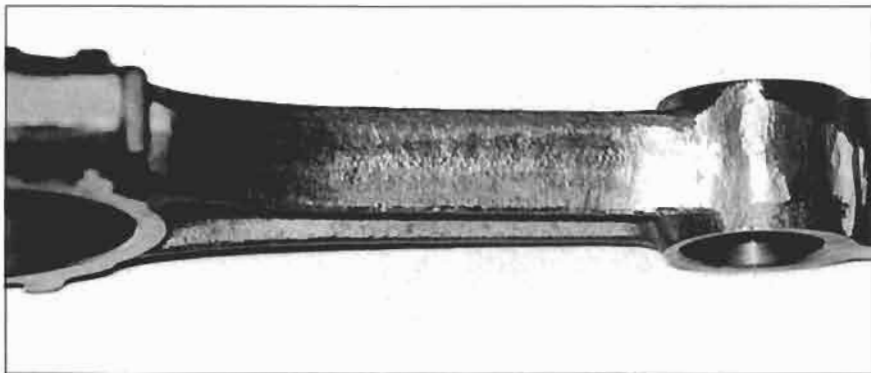
While resizing the large and small ends of the rod, along with shot peening, are definite machine shop steps, polishing the rod involves mainly labor, something you can provide more cheaply than the machine shop. Of course, if you prefer, shops like DSS typically offer reconditioned, polished rods in sets. In DSS' case, they retail for \$269.

2 *Quickly removing forging or casting lines and the rough pebbly surface finish is the job of a carbide cutter. Use eye protection and light pressure. All you want to do is smooth the rod, not lighten or reshape it. Leave the old rod bolts in place to protect the machined surfaces around the bolt heads. Then you can nick the bolt heads while carefully working the surrounding areas.*



1 *The skinny part of the rod joining the piston pin and bearing ends is called the beam. This is where careless handling or built-in edges can result in stress risers — sharp corners and edges where cracks originate. By polishing the beam and surrounding areas, the stress risers are removed, denying cracks an easy starting point.*

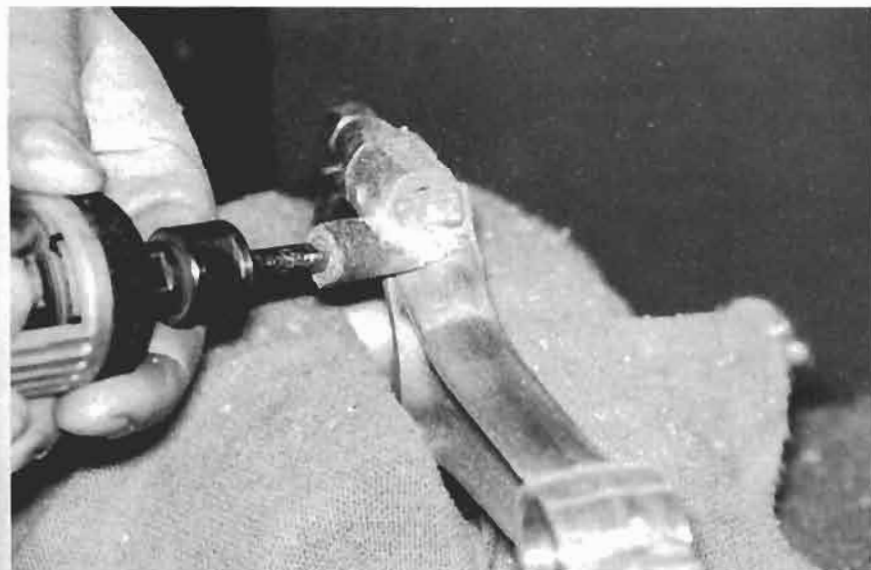




3 This is what the beam should look like after carbide cutting. Notice that the surface is not smooth, and no work has been done to the extreme edges of the beams, nor has the balancing pad been removed. Remember, the cutter really hogs out the material, so use it sparingly. DSS says the number one mistake is taking too much material with the carbide cutter.



4 Getting the rod smooth is the job of a sanding roll or drum. Use 60 grit paper and pass over all beam surfaces. Again, light pressure is all that's required, although you'll spend more time working the sanding roll than the cutter. It doesn't work as fast, and there is more area to smooth with the sanding roll.



5 Here you can see why it is important to leave a rod bolt in place. You don't want to disturb the machined surfaces under the bolt head, and with an old bolt in place, you can work right up to and even over the bolt to smooth the unmachined parts of the rod.

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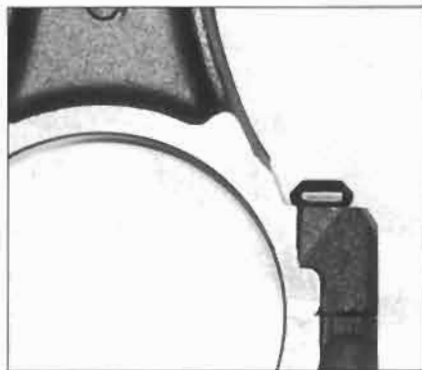
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6 Unlike with the carbide cutter, you want to make a pass or two down the edges of the beam with the sanding roll. The idea is to radius and smooth the edge of the beam to stop surface cracks. Just a light pass or two does the job.



7 The weak part of many Ford rods is the sharp cut where the rod bolt head is recessed into the big end of the rod. This is the narrowest part of the rod, and one reason why a stock rod, even with the best bolts and prep, can only support so much rpm or horsepower. Then it's time for premium aftermarket rods. Only the most outrageous street engines need aftermarket rods, but race engines are a different story.



8 Shot peening is done inside a specialized machine. The rods are hung on a rack, then bombarded by steel shot. The shot compresses the iron in the outer surface of the rod, strengthening it. DSS points out that only steel shot does any good; glass beads or sandblasting does only a cosmetic job, and doesn't have enough impact to compress the iron's grain structure. Typically the rods are left in the machine for 15 to 20 minutes.

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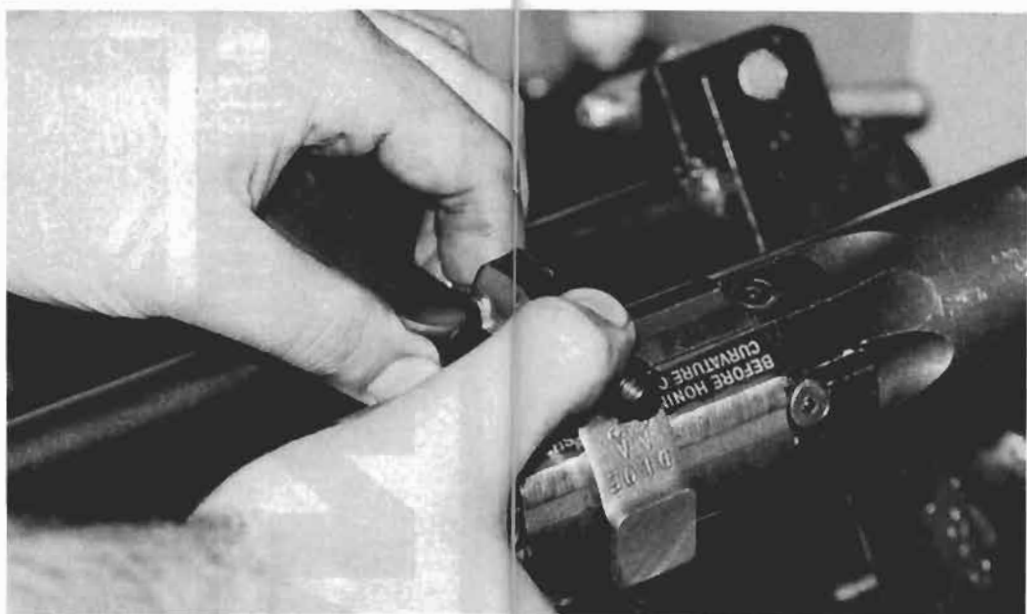
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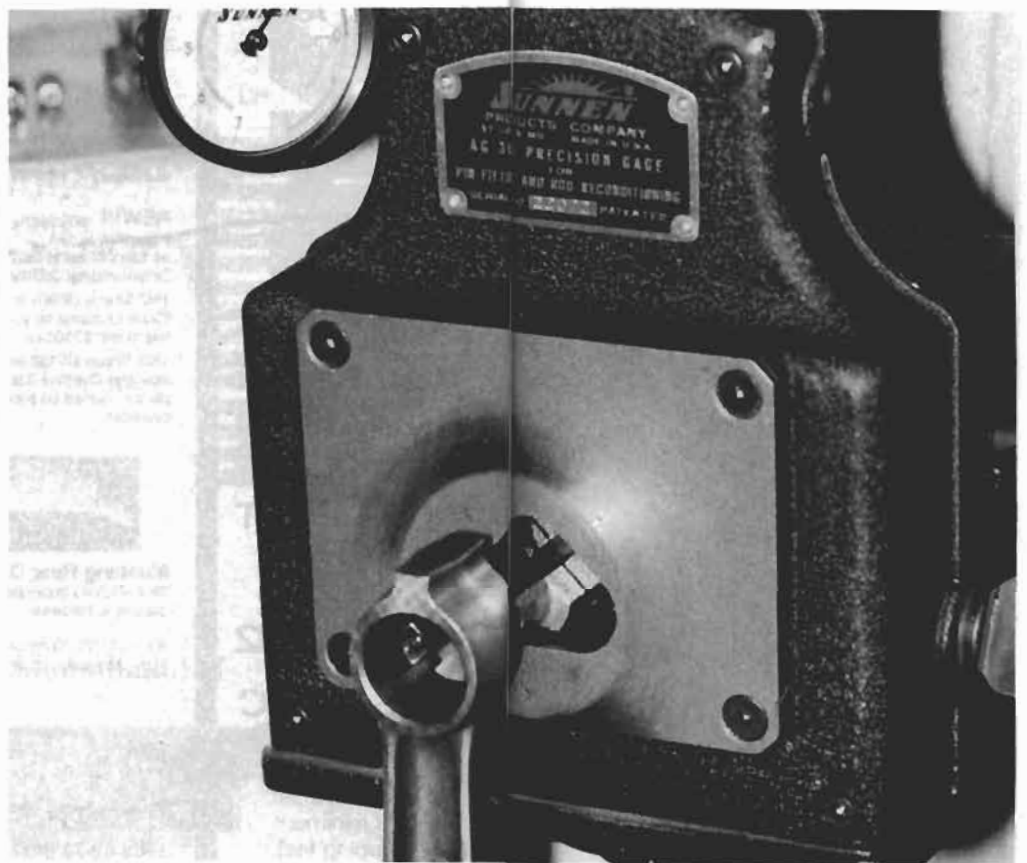
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9 To get the big end perfectly round, it is resized. This is done by grinding a small portion off the mating surface of the rod cap, then torquing the rod and cap together, followed by honing in this special

machine. The big end should be taken back to its stock size. Very radical race engines sometimes use slightly out-of-round big ends, but it's not the type of thing you'd use a stock rod for anyway.



10 At the piston pin, or small end of the rod, the machinist looks for a .0015-inch interference fit between the small end and the piston pin. The small end is honed just like the big end, and oversized pins can be used to bring a rod into tolerance. DSS says to check this dimension first so you don't spend a bunch of time on the rods only to find four of them have enlarged small ends. **SF**

Source:

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