

Forging Two-Sided Shoulders

By Jay Close and the CHF Committee

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Charleston, South Carolina

Lesson #26B.

Part Two: Forging Two-sided Shoulders on the Far Edge of the Anvil

Editors Note: In the last issue of the Hammer's Blow, the first part of this lesson was published with an incorrect headline. The editor regrets the error.

Intent: The student will learn to forge two-sided shoulders on the far, rounded edge of the anvil, using only the forging hammer to control the location and dimension of the shoulders.

Introduction: Forging two-sided shoulders on the far edge of the anvil is challenging. Where the hammer is being placed on the work is often obscured by the hammer head itself and one must hold the bar at an increasing angle to the anvil face as the shouldering progresses. Figure 2 below shows the desired final form: an approximate square of material centered on a tapered "neck." While the sketch below includes suggested dimensions, as in the previous exercise, controlling the form is more important than meeting a set of prescribed measurements.

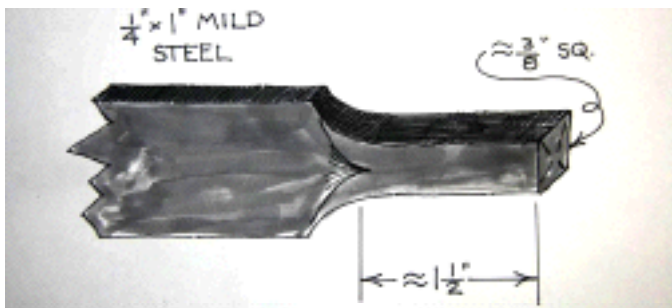


Figure 2.

As in the earlier exercise, smiths tend to be partial to a particular stance and presentation of the workpiece to the hammer and anvil. Either can be effective.

Tools Needed:

Basic forging tools only. See references in Part One concerning the general forging hammer, its selection and shape, and anvil set up.

Material:

1/4" x 1" mild steel, cut to approximately 24" in length (or any convenient hand-holding size). A shorter length held in well-fitting tongs is also acceptable.

Step #1

Heat two or three inches of the end of the bar to a yellow or lightly sparking heat. Place the flat of the heated bar on the anvil in an area with a rounded edge. A square of material 1-inch by

1-inch should project off the far edge of the anvil surface (See Photo 20).

Keep the bar horizontal as you rotate it on edge. Shift neither forward nor back. One inch of the stock should remain off the anvil as in Photo 21.

The first hammer blows must come confidently: three blows, each one progressively closer to the desired alignment with the anvil edge— better to be short of the perfect alignment than hit too far forward.

Depending on which forging stance you decide to use, different parts of the hammer head do most of the shaping of the shoulders. This is parallel to your experience in the first lesson.

After *three blows (no more!)*, rotate the bar so the edge once against the anvil is now uppermost. Reposition the workpiece so that the desired one-inch square of material is still off the anvil as in Photo 22. Adjust the angle of the bar so the just-forged edge is in contact with the anvil face.

Take two or three more blows working up to the edge of the anvil, then rotate the bar and work up to the other shoulder of the bar again. This is the same rhythm, forging and rotating, that you practiced in Part One. At an orange heat, the bar goes back in the fire. Working hot minimizes problems.

Note: As the shoulders develop, you must angle the bar on the anvil and cant the hammer into the shoulder. Have the tapered neck fully supported by the anvil at all times.

Step #2

Reheat the bar to a yellow heat and continue to draw down the neck. Hit hard but aim your first hammer blow confidently away from the edge of the anvil. The second and third hammer blow will move progressively closer to accurate alignment with the far rounded edge of the anvil.

Take no more than three hammer blows before rotating the bar, so the edge once against the anvil is now uppermost. Achieve the desired form by successive approximation.

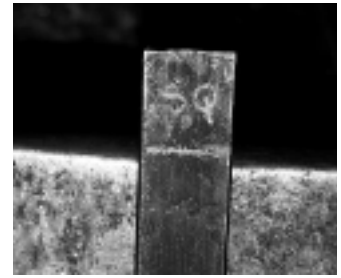


Photo 20.

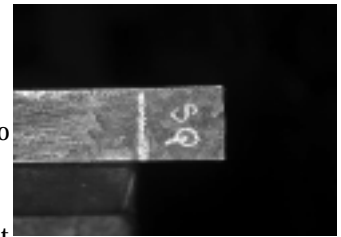


Photo 21.



Photo 22.

Troubleshooting

Comments made in reference to the first exercise apply here. The sooner a problem is corrected, the better.

Watch for hint of a fold or pucker developing in the neck where it transitions into the square of material on the end. If one should begin, flatten it out before going further.

An off-center mass on the end of the bar (Photo 23) is adjusted by placing the shallow shoulder on the rounded edge of the anvil. Then, apply gentle pulling force to hold the shoulder tight to the anvil edge, and with a sharp blow as shown in Photo 24, drive the mass on center. In effect, you are creating a shearing force focused at the transition where neck meets square to push the square into alignment. The shoulder must be in contact with the edge of the anvil for this to be effective.



Photo 23.

Shoulders that are different distances from the end of the bar can be improved by positioning the long shoulder as in Photo 25. A hammer blow directed through the diagonal of the bar by striking the upper corner will drive the shoulder forward into better relationship with its partner.

Often it helps to cool the corner that is to receive the corrective hammer blow.

If the mass on the neck is centered, but the neck itself is not in alignment with the axis of the bar, as in Photo 26, this too can be corrected. At a light orange heat, place the "neck" with the shallower angle uppermost as shown in Photo 27. A single blow should drive it on center.

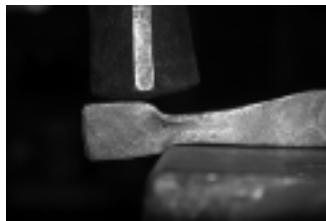


Photo 24.



Photo 25.

Targets

Forge the shape, including all corrections, in four heats.

Work toward a shape resembling Figure Two.

Pay attention to the following points:

1. The neck is evenly tapered, straight sided and centered on the axis of the bar.
2. The neck should be square in section at the point of transition into the square on the end. Expect the neck to grow thicker than the parent bar. This is okay for this exercise and often desirable in a finished forging, too.
3. The square on the end is approximately one inch square.

4. The square on the end is centered on the neck.
5. The shoulders are even depth.
6. The form is straight and without twist.
7. There is little or no hint of a fold along the neck.

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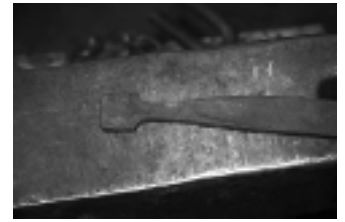


Photo 26.



Photo 27.

