Will Manning – Walt Anderson Scholarship Report - 2011

Making a forging hammer from a caterpillar track pin-

I had a caterpillar track pin and a scholarship. I hoped to return with a forging hammer- made from junk yard steel. OR at least some knowledge to allow this to happen. Upon asking Dave Smucker, my professor for the week, what kind of steel he thought the track pin was, he said, "it's NTS, but it's good for a making a hammer." NTS= not too sure. Based on the pin's use in a caterpillar, it's probably made out of the same steel as bearings, 52100.

NTS steel gets a heat treatment test, get 3 pieces and quench one in oil, one in brine & one in air.

Though we touched on specific steels & their characteristics, the outline for basic classroom operations was this;

1. Forge
2. Normalize
3. Rough grind,
4. Heat treat
5. Final sharpening/finishing

I started by cutting off 3 discs, about 3/8" thick each. These will be my test pieces for finding the appropriate method for heat treating. I used a metal cutoff wheel and I believe it cost the folk school about an entire cutoff disc to achieve this. My follow up studying has led me to wonder why in the heck I didn't anneal the pin first… live and learn.

For anything that seems good to make a hammer out of (i.e., axel, jack hammer bits, track pins, etc.), if you are going to heat test, I'd recommend a proper annealing prior to your attempt to separate three different pieces. Heat it up to its critical temperature (non-magnetic) and slowly cool it in a good covering of vermiculite (available at nurseries). This should take about a day.

We tested the three pieces by starting with an air quench, if this works there's no reason to try an oil quench. However, we moved on to the oil as the file test proved "not hard" with the air hardening. The oil, however, worked. Dave uses used transmission oil with a bit of diesel fuel as thinner and recommends using no less than 5 gallons. We used a simple file test to determine "yes" or "no" to the question of "is it hard?"
The file test- after you have quenched your steel, try to file on it. If it skates across as though it's on ice, then you succeeded. If the teeth cut your steel, it's not hard yet.

Now we knew what to do for the heat treatment… time to decide on the type of hammer we'd like to make. We started with a 4" long piece of the track pin.

Forge to shape.
First using tongs to hold it vertically; we upset the entire piece of steel until it was 3".
We then welded on a piece of rebar to what would become the face of the hammer.
After the handle was on, I had a sure grip on the chunk of steel and proceeded to square it up. After I got it square, I took off the corners & drew out what would become the peen. Leave the peen fairly blunt. You can always thin it out further or grind it down some. It's a bit more difficult to undo that though.
After you have the rough shape achieved, punch the eye. We used a punch in the fly press that was made out of S7. It was a miniature hotdog shaped punch with a blunt face and a slight taper. It worked beautifully in 2 heats. Most of us don't have access to a fly press so, punch the eye hole by hand with a strong and accurate striker.

Once the eye hole is punched, it must be drifted to the right shape and size. Decide what would be best. I would, in the future, use a drift that matches what handles are readily available as I'm also still learning about handles…. At the folk school I went with a rectangular/oval drift that matched many other hammer eyes available for inspection.

Make a mark on the drift at the point where the drift is the size you want the eye to be finally. Drift almost to the final size from one side, flip hammerhead and drift to final size. Flip again and drift to final size. The goal is to achieve an eye with a cross section of hourglass-shape so that you can insert a handle and use wedges to make it stay in place.

Once the hammerhead is to shape, let it cool down slowly- no need to anneal it again, but you don't want to quench it either. Cut the handle off with a cutoff wheel and grind to final shape using a belt sander or an angle grinder.

The heat treatment…
I hardened and annealed the entire head. Slowly bring entire head to critical temperature and quench immediately in the oil/diesel fuel mix. Move your quench tub close to the forge. You want to quench the steel as the temperature is on its way up, so quick movement from the fire to quench tub it important. Move the hammerhead around and up & down in the quench tub to help it harden more evenly.
Dave Smucker recommends an hour in the oven for tempering most tools, however, with a hammer head, he said to leave it in there for two hours, due to it's mass. We tempered every tool, all week long, at the same temperature of 400 degrees.

The hammer works. The next one will be a bit smaller. The piece of steel I started with was about 1/2 a pound to heavy for me in the end. The face, with rounded edges, was still a bit too wide and until I gain more control over this hammer, I'll do better to avoid corner marks by using a more rounded face hammer. The peen is perfect. With the weight of the head behind it, the peen really gets the job done. Like all tools, it has its purpose. Sometimes what I'm using it for is perfect and at other times it completely useless for what I need. The cheeks on this hammer are a bit wide- the part to the left and right of the eye. I'd consider forging those up, down and flat to make a Hofi-style hammer with a tighter center of gravity.

Thank you, FABA, for sending me to the John C Campbell folk school. Though I never met him, I am thankful for Walt Anderson, the first volunteer editor of THIS newsletter and major contributor to the Blountstown Pioneer Settlement blacksmith shop (where I have seen the most inspiring blacksmithing demos). Thank you, group of blacksmithing mentors.