A Few Remarks about the Sword Plaque Project

Robert Penoyer
Copyright © 2018

A WARNING – PLEASE READ

Woodworking can be dangerous! It's up to you to determine if you can safely use the tools and perform the tasks needed to complete this and any other woodworking project. If you are unsure, STOP! Get advice from someone knowledgeable or do some careful studying on your own. Be safe!

Always wear at least an appropriate N95 dust mask or respirator when sanding or spraying paint. For advice about dust masks and respirators, visit this link:
https://woodworkingtoolkit.com/best-dust-masks-respirators/

READ, UNDERSTAND, AND FOLLOW ALL OF THE INSTRUCTIONS AND WARNINGS THAT CAME WITH YOUR TOOLS. BE CAREFUL!

!! IMPORTANT !!

THIS PLAQUE HOLDS A SWORD! SWORDS ARE DANGEROUS! THE SWORD IS HELD IN PLACE IN OPEN MORTISES ON SADDLE BLOCKS AND MAGNETS IN THE SADDLE BLOCKS. A SITUATION MIGHT ARISE IN WHICH THE SWORD COULD FALL OFF OF THE PLAQUE. BE CAREFUL! DO NOT LEAVE SMALL CHILDREN OR LARGE ANIMALS UNSUPERVISED AROUND THE SWORD AND PLAQUE.

The SketchUp File and Associated PDF File Contain Known Incorrect Dimensions

This Instructions file contains updated information. Use the SketchUp file and the associated PDF file as guidance but refer to these Instructions for correct dimensional information.

Please be aware that there might be other mistakes in the documentation that I accounted for during the build but failed to note in the documentation.

The Plaque

The design described in this file and the accompanying photographs is for a plaque that is meant for the display of a specific sword. All dimensions are intended for use with that sword. Dimensions will probably have to change if your plaque will display a different sword.

- Sword Total Length: 38 5/8"
- Sword Blade Length: 32 5/8"
- Plaque Height: 42 1/2"
- Plaque Width: 9 7/16"
- Plaque Bottom Radius: 2"
- Length of Parallel Sides: The length of the parallel sides given as 11" in files *Sword_Plaque_02.skp* and *Sword_Plaque_02.pdf* is actually 13 3/8"
- Blending of Parallel Sides and Tapers: The boundaries where the parallel sides blend into the long, tapered sides are blended by sanding
- Correction of the Rounded Cuts at the Top of the Plaque: The 1 9/32" guidelines in files *Sword_Plaque_02.skp* and *Sword_Plaque_02.pdf* were used in the build, but the compass for the blended rounded cuts was adjusted to blend with the 2" radii at the corners
- Edge Treatment: 3/8" round-over with about a 1/8" step or bead to the front surface. This is shown in one of the accompanying photographs.
- Material: 4/4 sapele (sah-PEE-lee). The original material was 4/4 (four-quarter, or 1 inch) but it was slightly cupped. So the material was planed to flatten it. The final material was, thus, thinner than 4/4. Its final thickness was perhaps 3/4".
- Finish: 1 coat of sanding sealer + 5 coats of water-based clear polyurethane

<u>A SketchUp File and a PDF File</u>

File *Sword_Plaque_02.skp* is the SketchUp design for the plaque. File *Sword_Plaque_02.pdf* contains the image and dimensions from the SketchUp file. Use the PDF file if you're not familiar with SketchUp.

As noted earlier, <u>the SketchUp and PDF files contain dimensional errors</u>. Use the information in this file to correct those errors.

Saddle Blocks

So-called saddle blocks are used to support the sword at the hilt (top saddle block) and keep it vertically aligned near the end of the blade (bottom saddle block.)

The saddle blocks each contain rare earth magnets to hold the sword in the plaque. If you build the plaque, be sure to use bright, shiny rare earth magnets, not the dull, gray ferrite type of magnets. The rare earth magnets are much stronger and will do the best job of holding the sword in place. The sword is more likely to slip and fall out of the plaque if you use weaker magnets. USING WEAK MAGNETS CAN BE DANGEROUS!

The saddle blocks are made from the same sapele material that was used to make the plaque. In each case, two layers of sapele were glued together to form a block and then cut to the correct size

The top saddle block has a mortise that "just" accommodates the widest part of the sword's blade. The sides of the mortise support the sword at the hilt. Two rare earth magnets are used in the top block to hold the wide, flat part of the blade. The magnets are housed and epoxied in counterbores such that the counterbores' diameters are good fits for the magnets. The correct depths of the counterbores make the front surfaces of the magnets flush with the front surface of the block.

Also, there is a shelf or cutout inside the top saddle block to accommodate a thick portion of the hilt near the blade. This is shown in the accompanying photographs.

The bottom saddle block has a mortise that "just" accommodates the width of the blade near the tip where the blade rests in the block. Only one magnet is used in this block. As with the magnets in the top saddle block, the magnet is epoxied and housed in a counterbore such that the counterbore's diameter is a good fit for the magnet and the correct depth of the counterbore makes the front surface of the magnet flush with the front surface of the block.

Mounting the Saddle Blocks to the Plaque

After shaping and fitting the saddle blocks to the sword, they were mounted along the center line of the plaque using glue and screws driven in from the back of the plaque. Because the plaque is intended to be mounted flush to a wall, counterbores

were used so that the tops of the screws' heads were below the surface of the back of the plaque.

Orientation of the Two Magnets in the Top Saddle Block

It is important that the poles of the two magnets are arranged to provide the greatest pull against the blade. This can be done by orienting their poles as shown in Figure 1. The yellow rare earth magnets are epoxied in counterbores in the green saddle block such that their surfaces are flush with the surface of the block and their poles are opposite.

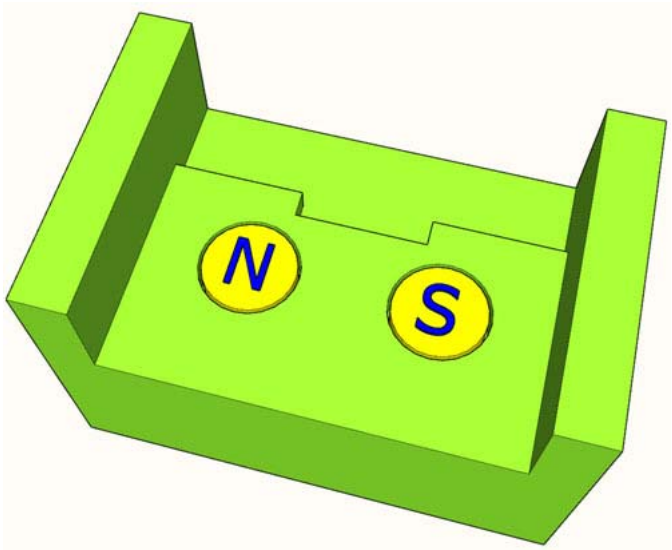

Figure 1. Magnets in the Top Saddle Block. The magnets in the top saddle block should be oriented so that their opposite poles are facing the sword. (Proportions are approximate.)

The approximate dimensions of the top saddle block are given in Figure 2. The bottom saddle block is similar but its mortise does not include the step shown in the figure. Also, the blade is narrower near the tip so the bottom block's dimensions should be adjusted accordingly.

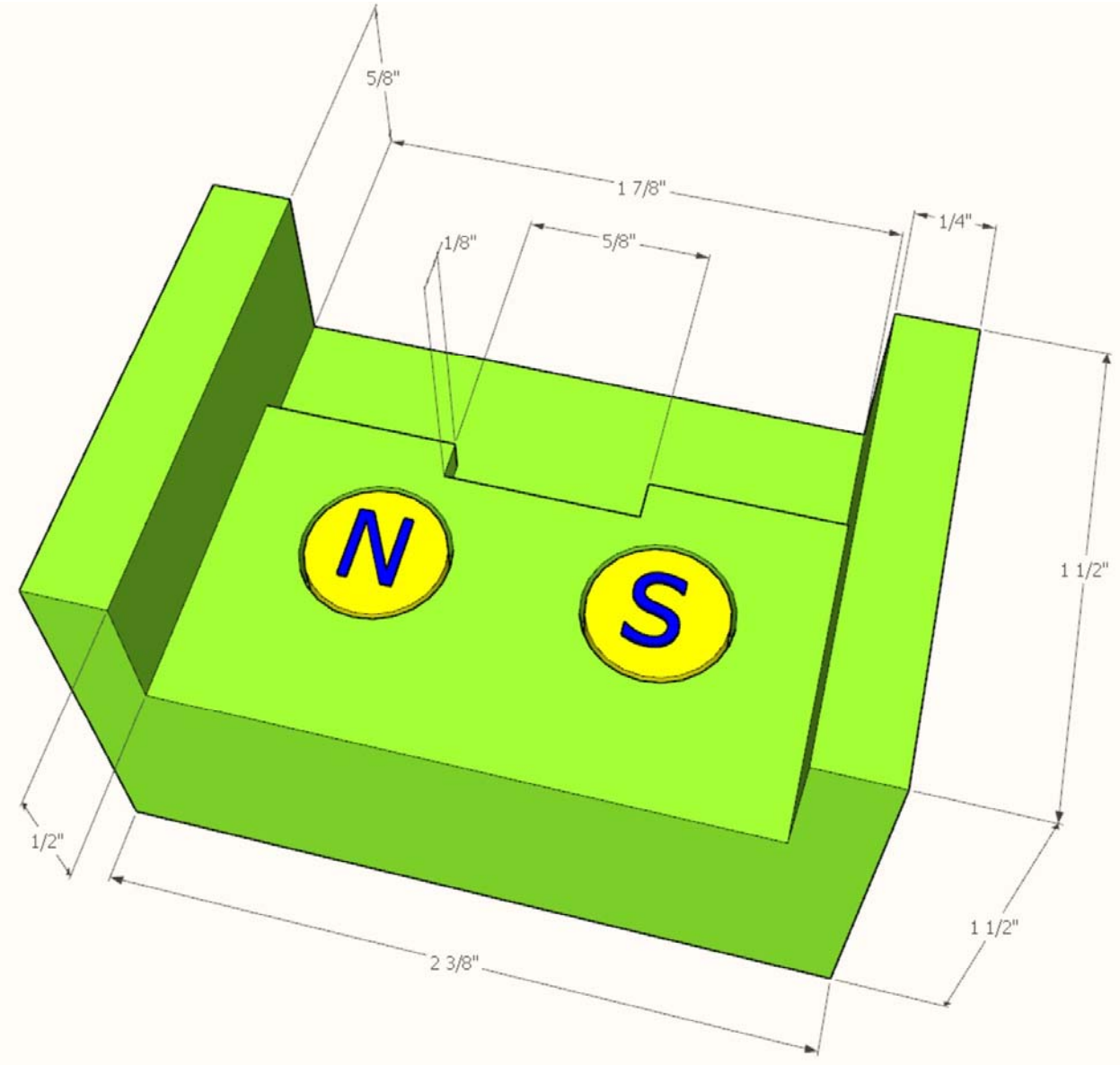

Figure 2. Top Saddle Block Approximate Dimensions

Slot to Accommodate the Hilt

As shown in the accompanying photographs, a slot was cut through the plaque near the top saddle block. This was needed so that the sword would not have to sit too high above the surface of the plaque.

The location, orientation, and dimensions of the slot took a bit of artistry to achieve. As it happened, the slot ended up being positioned exactly as it should have been to accommodate the part of the hilt that swings toward the back of the sword. If your version of the plaque requires a slot, be especially careful laying it out.

Mounting the Plaque to a Wall

The plaque is designed to be mounted flush against a wall. Two screws hold the plaque to the wall. One screw passes through each saddle block so that the screw and counterbore that holds it are not visible when the sword is in place. As can be seen in an accompanying photograph, the counterbore in the top saddle block is nominally centered in the block.

The counterbore in the bottom saddle block is not centered. This was not a deliberate choice but became necessary due to other factors. You might try to center the counterbore so that it is aligned with the centerline of the plaque.

Be sure to provide some removable marks (e.g., using tape or Post-it Note) to indicate the centerline at the centers of the top and bottom of the plaque. Use these marks with a level to check for plumb when mounting the plaque to a wall. Better, use a cross-line laser level with these marks to plumb the plaque.

Where to Mount the Plaque?

Two factors should be considered when mounting the plaque and sword. First, high-traffic areas should be avoided. You should not locate the sword and plaque in a location where people, equipment, or other things are likely to bump into the sword and possibly cause it to fall off of the plaque. This could be dangerous!

Second, an important question is, How high should the plaque be mounted on the wall? I don't have a definitive answer. For example, When is it too high? Or, too low? What is a pleasing height? That will be your choice.

The bottom of my plaque is 33" off of the floor. It's located on a bedroom wall where traffic is low and where children are unlikely to wander.