Story Stick – Creation and Use
Thames Valley Woodturners Guild

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Jan 10, 2013

Purpose: To understand how to create a story stick for duplication of turnings and how best to use a story stick. To create a story stick based on a re-scaled picture/drawing of a woodturning.

Demonstration: Reproduction of a candlestick

Tools: Some tools I used are listed below. Some of the items listed are optional depending on your preference.

- Vernier calipers
- Square
- Flexible rulers
- Molding templates
- Hardboard for story stick
- Direct read calipers
- Normal calipers and ruler
- French curves
- Horizontal turning holder/jig

Method 1: Create a story stick from a turning

Steps:

1) Select a piece of hardboard which is slightly longer than the piece to be reproduced. Use wood which is easy to write on and will maintain the registration marks without smudging. I used 1/8" hardboard and marked with a pencil. Once measurements are confirmed you can go over the pencil with pen or marker.

2) Set up the turning in a horizontal holder. Identify which end of the turning will be at the headstock. The headstock side will be where the zero of distance measurements are measured from. This is called the reference line.

3) Select a zero point on your turning for the reference line. It could be the base or the bottom of the first bead. It should be easily identifiable.

4) On your blank story stick, mark a horizontal line back from the edge which will serve as a line of symmetry for a drawing of your turning in profile.

5) Mark the zero reference line on the left hand side of your story stick using a square. Mark the line as zero and ensure the line goes far enough back to intersect the symmetry line of your turning profile. Measure the diameter of the first feature at zero distance and mark it on your story stick.

6) Calculate ½ the diameter (radius) measured in step 5 and mark a line up from the symmetry line. This will be connected to the next radius and will produce the profile of the turning as you progress.

7) Look for the next identifying feature in your turning from left to right. It could be the top of a bead, bottom of a cove, or an arbitrary location along a curve that you want to use as a diameter-check as you turn. **Label this feature with a number!** The zero reference line will of course be the 0^{th} feature but remember to consecutively label each feature as you go. The brain will be able to pick out numeric features more easily especially when the lines become close. Measure the distance offset from zero on your turning and measure the diameter with Vernier calipers.

8) On the story stick, mark the offset from zero with a square line drawn back to the symmetry line. Mark the diameter on or beside the line. Calculate the radius and mark the radius up from the line of symmetry. Connect this point to the previous radius point to show the profile of this section.

9) Repeat steps 7, 8 until you arrive at the end of your turning.

10) Identify any outstanding features or tricks on the story stick such as where to hollow, how large or long a tenon or mortise to include. You can create profile templates and label them on your story stick so you know which profile template to use for each section.

Method 2: Create a story stick by re-scaling a drawing

Steps:

1) Select a hardboard as in method 1 and draw a symmetry line on it.
2) From your drawing, identify which side will be the headstock side and identify a zero reference.
3) On your drawing, identify the scale up or scale down factor you want to employ. (Example 4/3 will upscale the drawing by 30%)
4) Mark your zero line on the story stick. Measure the diameter on the drawing and rescale by your scaling factor. Remember to convert to your favourite units (metric or 1/8ths or 1/16ths standard)
5) Mark the radius up from the symmetry line.
6) Measure the offset of the next feature on the turning. Scale the offset by your scaling factor. Mark the scaled offset on your story stick.
7) Measure the diameter of this feature and scale by your scaling factor. Label this diameter on your story stick. Mark the radius up from the symmetry line and draw the connecting line to the last radius.
8) Repeat as above until all features are identified on your story stick.

How to Use Your Story Stick:

1) Set up your turning billet on the lathe after all pre-work has been completed. Devise a way to mount the story stick behind your turning so you can look up to it and also pull it down to hold up to your turning very easily.

2) Hold the story stick up to your turning to mark the zero line and the largest diameters first! Extend the lines all the way around the turning billet.

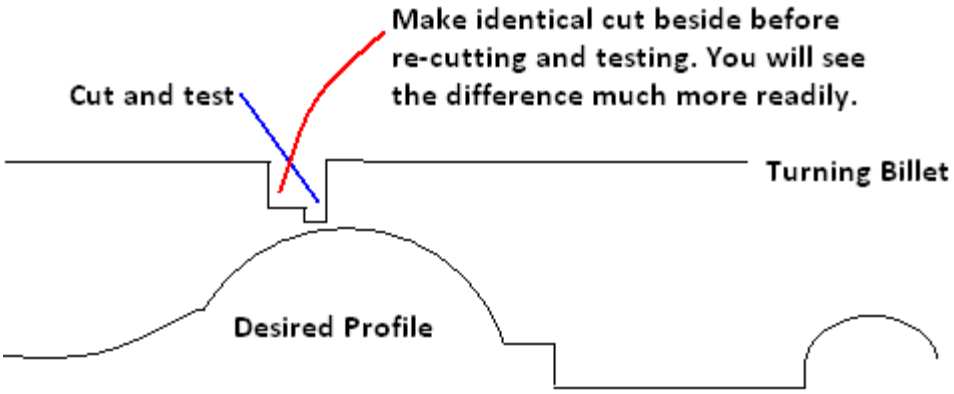
3) Turn down the blank to the highest diameters while leaving some registration marks on the turning for reference! I found it useful to re-draw the zero line after the diameter has been turned for ease of reference to the story stick.

4) Mark your other reference lines on the turning in whatever order makes most sense to the turning. Note to yourself if you should cut on the line or to the left or right of the line.

5) Either set vernier calipers to the diameters to be turned or pre-set some calipers to the diameters required and label them with masking tape to reflect the station number on your story stick. You can put a board of nails up under the story stick and hang the calipers off the corresponding nail.

6) Turn the diameters down to size and join them with the appropriate turning, using your templates if you made them.

7) Whenever possible, while turning down the station to the proper diameter, waste away beside the line to the same depth ***before*** continuing to cut to the next depth. The eye can see the relative depth from the last depth cut very easily. Example, when cutting a bead height, cut and test the bead diameter at the edges. If you cut too much off you can always cut less off at the center of the bead, and you have to cut off the edges of the bead so your mistake will disappear.



8) When marking subsequent diameters to cut on the turning, always zero your story stick before marking the diameters and draw a few extra lines for reference. You don't want to cut too far to the side of a thin feature.

9) Make any helpful hints on the back of your story stick for the next time you use it! If you don't use the same story stick for a year you will have great notes on it to remind yourself before you use it again.

Suggestions:

1) When creating your story stick, always measure offsets from zero to reduce error. Measuring from the last feature will compound your error. Remember that the error in a sum is the sum of the errors!

2) Use a French curve or molding pin stick to reproduce curves from the original on your story stick.

3) I bored the hole for the candlestick before cutting the billet to final length. This made it a little more difficult to bore the handle hole once the bulk of supporting wood was removed. Think of what pre-work needs to be done before turning.

4) If there is a difficult section of a smooth curve, consider making a hardboard template to put against the turning to let you know when it is acceptable. Label this template and mark the template number on your story stick.

5) Ensure you write your labels so you can read them when the story stick is lying horizontally…unless you have a vertical lathe!

6) If you are scaling your measurements off a drawing, consider entering the raw distances and diameters in an Excel spreadsheet and using a formula to convert all values as below:

   Formula:

   =INT(A1) & " " & (FLOOR(A1,1/16)-INT(A1))*16 & "/16"
   This rounds DOWN to the nearest 1/16th to ROUNDUP change the FLOOR function to CEILING.

Sample Story Stick for a candlestick