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HOMEMADE CALIPERS

Commercial calipers are well made and accurate but often they are too large or won't work in tight spaces such as hollow forms. These shop-made calipers will fit where others can't and will make accurate measurements of wall thicknesses much easier. They cost just a few dollars and don't take long to make, so you can produce several different sizes to fit your needs.

I made this set primarily for use with bowls supported by Coles jaws so I can accurately gauge the wall thickness as I turn the outside of the bowl. These shallow bowls are the basis for my split bowl turnings and are turned in the reverse order normally used. The inside of the bowl is turned first and the resulting form is remounted in the Coles jaws to turn the outer visible surface.

I set the rubber bumpers of the Coles jaws so that there's a gap between the jaws when it's tightened down on the bowl. I can then insert the calipers in the gap and accurately measure the wall thickness all the way to the center of the bowl- something you just can't do with conventional calipers.

Construction is very straightforward. It's easier to actually build it than it is to describe its construction. I use 1/8"x1/2" aluminum bars available at most hardware and big box stores. This particular set took about 5' of bar stock but other sizes will vary. The various pieces are simply glued on top of one another with CA glue and the only machining is to drill a couple of holes for the pivot bolt.

There is little that's absolute in the construction of these calipers. Make them whatever size you need. The most critical measurement is the location of the holes in the main bar. The hole has to be centered exactly so that when the caliper is opened, each side will open the same distance.

I made the main bar narrower than the others so it would fit in the opening in the Coles jaws behind the captured bowl. I cut the 1/2" stock to 3/8" on a table saw. Aluminum is soft enough to cut with sharp tools without damage. Exercise caution when cutting aluminum on the table saw. You could leave the bar 1/2" wide if it suits your needs or you may be able to find 3/8" stock already available. I chose 17" as the overall length, but that's arbitrary. Whatever length works for you will be fine. The pivot hole is placed at exactly the center of the bar. Use the actual length of the bar as a guide. I cut the angled pointers with a miter saw set at 45 degrees, using solid sacrificial fence and taping the pieces down to prevent them from moving. It's easier and safer to cut the angle first and then cut the piece to its proper length.

I made the main cross bar 7" long with the pivot hole at about 1 1/8". The various other members should be measured and cut based on these 2 pieces. The idea is to have the sections sized so that when the caliper is closed, the points meet precisely. The bars are wide enough so you have a little fudge room and the pointers don't have to line up exactly with the edges of the support bars.

Once you have cut the pieces to length, drilled the holes in the main bar and crossbar, and cut the angled pointers, lay them out on a table. It helps to draw lines or use a square to make sure everything is lined up properly. Insert the bolt to establish the pivot point and square up the main bar and cross bar. Clamp to the table if possible. I used medium CA glue to assemble the pieces. Work carefully to apply the glue and line up the pieces. Medium CA gives you a little working time to make minor adjustments. Once the first 2 pieces are glued and lined up, spray with accelerator. Let the glue cure for a couple of minutes before proceeding.

Continue gluing each piece in sequence, maintaining the proper angle and location. Just do one joint at a time. If something is a little off, it's no big deal, except for the short pointer pieces. They need to line up accurately with each other so the points touch when the caliper is closed. I found that doing the wide end first is easier and less prone to mistakes. Once that end is done, work on the other end. Glue one of the points in place, making sure it's exactly the same distance from the center hole as the other pointer. Align the previously glued pointers so they just touch and tape the whole thing down to prevent movement. Glue the last pointer in place so it just touches the other one and hold it until the glue cures.

Once all the CA has cured, tighten the bolt with the capture nut enough so that the caliper will open and close easily but not loosely. The aluminum is flexible enough that you may have to line up the 2 pointers so they're across from each other, but you'll be able to get a very accurate measurement once the pointers inside the vessel touch both sides.

The CA works, but I've discovered that it doesn't bond as well as I thought it would. You might try using epoxy instead. You could also make them out of wood, but it'll be more fragile and the points may not stay sharp as long as aluminum.

These calipers will give you pinpoint accuracy and serve as your eyes when you can see how thick the walls are. Because of the points, you can change wall thicknesses with precision if the need arises.

