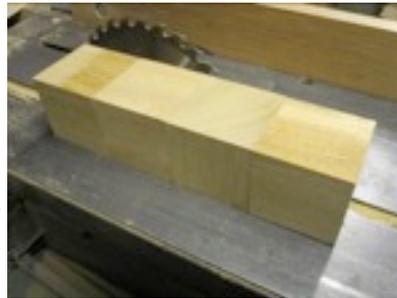


CHRISTMAS CANDLE HOLDER

Mark Mercer



My wife bought some spherical candles and instructed me to make some of those cute three cornered candle holders for a local church fund raising effort. David Muckle did one for us in his demonstration a couple of years ago remember? The Newsletter did not record any of his hints or tips but I think he made it look a lot easier than it really is. Well, don't they always?



You are going to turn off three of three pointed cup, the diameter of square dimensions of the cube. I but the diagonal dimensions inside a cube are obviously greater than those of the outside if you think about it. But how do you work out what size cube you need for a given size of candle? Answer: I have no idea! By trial and error I found that a 2.5 inch cube (the maximum height of my circular saw blade) turned out to be about right for a 3 inch sphere, the dimension of those my wife had bought, except for a little flat foot we need not bother about.

Obviously you start off with an accurate cube and set it up between centres using opposite corners. A cube has eight corners to start with. them and leave three to form the which is going to be larger than the have no idea how to calculate this



In order to mount your cube between centres you need a bit of a flat on opposite corners. This flat portion turns out to be an isosceles triangle because a section of a cube viewed from the point of view of the turning centres is a three sided pyramid. For the first few, I sanded off the corners until the flats were big enough to fit my centres. I did not worry unduly about the accuracy of the flats but this was a mistake. When turning a lot of air it is easy to get a 'catch'. The first time this

happened the block just took off and left the scene with me standing there a bit startled and puzzled as to what on earth happened. I soon realised that the steb centre teeth had only been biting properly at one side. Maybe the flat was not quite isosceles or maybe the centres were not dead opposite. The problem is a steb centre has a spring loaded point. Any side pressure will compress it and release the work to either wobble or fly.

Lesson 1: Whereas your old fashioned drive centre is quite happy with a less than square end a steb centre requires a flat surface dead square to the turning axis. Ergo: A steb centre is not safe if used on an inaccurately sawn log. Has anyone else noticed this problem I wonder? Maybe no one else is daft enough to have waste money on a steb centre?



After three or four efforts with varying degrees of success I thought that instead of sanding the flats for the centres it would be better if I sawed off the corners to form a much bigger triangle to save a lot of turning time and effort. The corners could be cut down to a size closer to the diameter of the spigot which forms the base. (As it happened the sawn off pyramids eventually made quite neat little desk pen holders – at the suggestion of my youngest granddaughter). Problem:



How do you hold a cube in order to cut an accurate three sided pyramid off a corner? If you have the time to spare stop here; pick up a box of some sort and think about it. I made a jig to hold the cube at 45 degrees to the saw blade in two planes. This worked after a fashion but did not produce the isosceles triangle shape.

I then tipped up the saw table to 45 degrees to the blade and notched a piece of timber to hold the cube at 45 degrees to the guide. Surely this would do it? It didn't. Each side of the pyramid base is at 45 degrees to the *side* of the cube but the table needs to be tilted at the correct angle to a *corner* which cannot also be at 45 degrees. I just cannot work this out so I asked my sister-in-law for advice.

She knows absolutely everything about everything and pontificates at length on every topic that comes up. She said "It must be 60 degrees because an isosceles triangle has three 60 degree angles." That is true but totally irrelevant and not the angle for the tilt of the saw table. Wonderful! I have turned up something she does not know . . . ! Every cloud has a silver lining :) If *you* can do the maths, especially if you can explain in words of one syllable, I would be delighted to hear from you.

I did eventually get the angle right by trial and error and then by using Google Sketchup – a most amazing free of charge easy to use 3D drawing programme. I strongly recommend this programme to anyone who has a PC. Just looking at a sample shape and moving it around is mind boggling.



Back to the job. Fixing the now much reduced block between centres requires finding and punching the centres. Because the centres are close together it pays to be very careful about this to prevent a wobble causing your points to end up not quite opposite. You now have six points whizzing round with a lot of air between. It is going to be noisy! The



first turning operation is the dovetail spigot – which is also the base of the finished item. You could finish the outside at this point. In fact I did this to start with but then found it better to cut out a female dovetail so that I could mount it in a chuck the other way round. Otherwise you have to part it off and clean up the bottom off the lathe. Having mounted it with expanding jaws, taking care not to over tighten because it would be easy to break off the points, I still use the tail stock to give me confidence in the not over tightened hold. You can now knock off the points you don't want and use the opportunity both to practice the difficult cut and to assess how fragile the end grain edges are before you do the points that you want to keep. You are looking for a nice hemispherical curve between the points and the neck of the spigot, taking it down till the flats have just disappeared. Before polishing the spigot I take it down as small as possible to fit the jaws with an all round grip to avoid jaw marks. The tail stock gets backed off then to finish the bottom and sand and polish.

I use five grades of 2 inch Velcro pads on a drill because it is quick and relatively easy but it is a bit tricky over the points. Although every demonstrator says "sand slowly" I like



to have maximum revs on for this job because then the sanding disc, being, as it is, in a hand held drill, does not get time to drop into the gaps. I also think that turning at high speed with a very sharp tool reduces the amount of break out on the end grain when air turning is involved. I expect this idea to be frowned upon by the pundits but you can do what you like when nobody is watching can't you? I also like to do it with the lathe in reverse.

Forming the inside is a more or less a standard bowl turning job. It is easier if you use a template of the same diameter as your spherical candle. The only hazard is that of going against the grain and causing some 'break out.' I realised before starting that I would need a very sharp tool because whilst two of the corners of the pyramid would be presenting 'with the grain' the third would be approaching the tool at a bad angle, not even 'square on' end grain but at an undercutting angle calculated to lift flakes out of the surface. You can use a scraper in the base area but up toward the points a scraper would be an instant disaster. Chips did fly however careful I was and I lost a couple before deciding to chamfer down the 'at risk' edge with electric sander, thus avoiding having to cut it with the gouge. This idea was quite successful. You can sand the 'against the grain' edge down to where you want it to be, then turn the rest of it down to that point without so much risk of its breaking away. You may have a better idea.

The job is not entirely unforgiving. If you have knocked out a small chunk and can't find it amongst the shavings you may be able to sand down all three top edges ending up with a smaller but quite acceptable job. Having broken off the tip of one corner I also found it acceptable to round all the corners on a sanding disc. Some people actually like the rounded off points better than the sharp ones.

I used idigbo and cherry because that is what I happened to have in stock. These are OK but the amount of tear out requires a lot of sanding. A tough close grained timber would be much easier to work but more annoying when spoilt if you have paid good money for it.



A candle in a wooden holder creates a slight fire hazard. I considered putting a metal disc in the bottom but instead relied on a printed notice supplied with the candle advising people never to burn the candle to the bottom.

That's it then. A bit more sanding and polishing and Hey Presto! You have spent a couple of happy hours making a little novelty your wife will sell at the church fete for a couple of quid. Lesson 2: Stuff the candle holders. Make weed pots. Same price. A tenth of the time.

If you are interested and haven't worked it out for yourself I will tell you the saw bench angle and show you my pyramid cutting jig (you can make a better one) at the next club meeting.

Mark Mercer. November 2010