After prototyping I soon discovered that the square bar I used was not really sufficient enough to support as larger staircase as I designed therefore I made the decision to use a 4mm hexagonal shape which, being larger in diameter, is much more sturdy in a long length than the square alternative. Due to this change I had to go back to 2D design and redesign the step, with a larger central circle to accommodate the larger rod. After then going through the same process with the hexagons I was able to run of another prototype in corrugated card. Luckily this worked perfectly and I proceeded to cut the actual steps out of 9mm laser ply. After making the steps I proceeded to work out how they would fit in with the three floors, it was obvious to me that they should slot onto the centre rod in the same manner of the steps, creating a central beam which would hold the entire structure together soundly.

To the left are screenshots of the designing of the new step.

Finalised Step Design

Below are the screen shots of the designing of the three floors, in the first shot you can see how I designed the floor plan. It was necessary to make the towers fit in with the back curve and the staircase as the floors are what will hold the castle in place. When I prototyped this however the ring around the tower complicated the design and looked out of place so I modified the design as you can see in the third design. This replaces ‘step one’ in the sequence of the staircase and has an opening so that the staircase curves around unbroken up the tower. The two holes are for the outside towers and there are slots for the back half tower to fit in. When putting this together however the gap between each outside tower and the central one was too great so I moved the slots for the middle tower further into the floor so that it intersects the holes for the other towers. The bottom design to the left is the design for the central floor which is important that the stairs curve around unbroken hence the shape of the cut off. The design next to this is for the bottom and top floor, as the staircase does not go through either floor it reaches back to hug the inside of the tower with a hexagon for the rod to secure the stairs.

Floor Designs