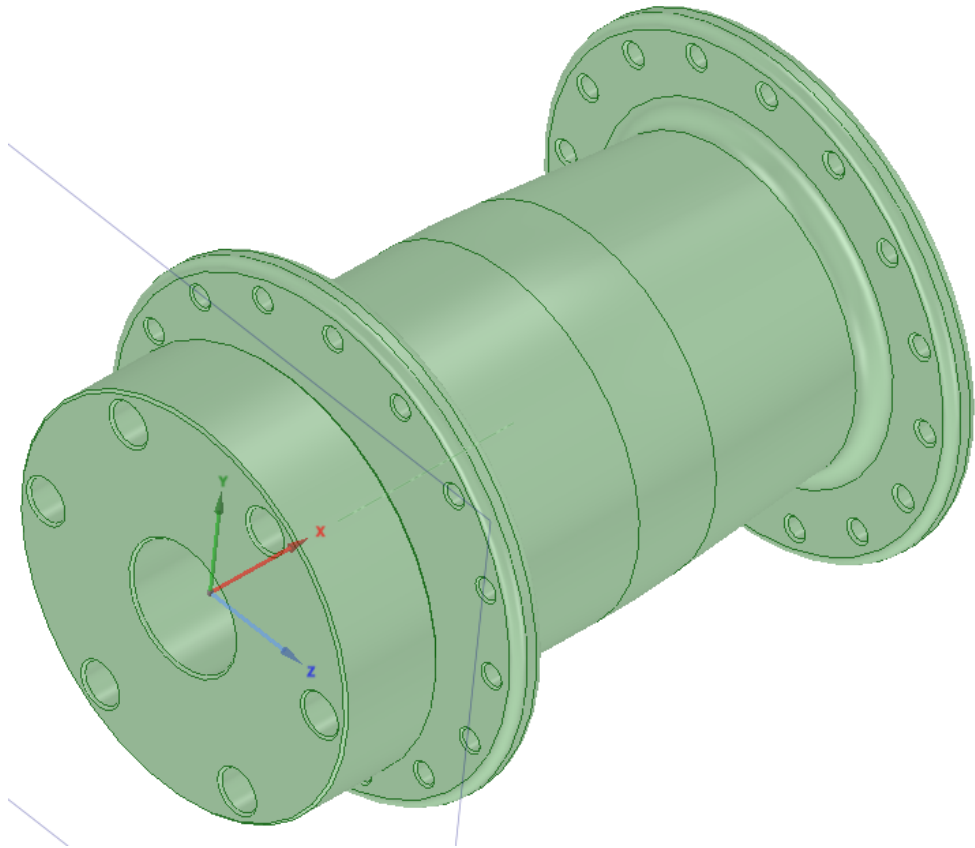


# Tutorial 2: Bike Hub



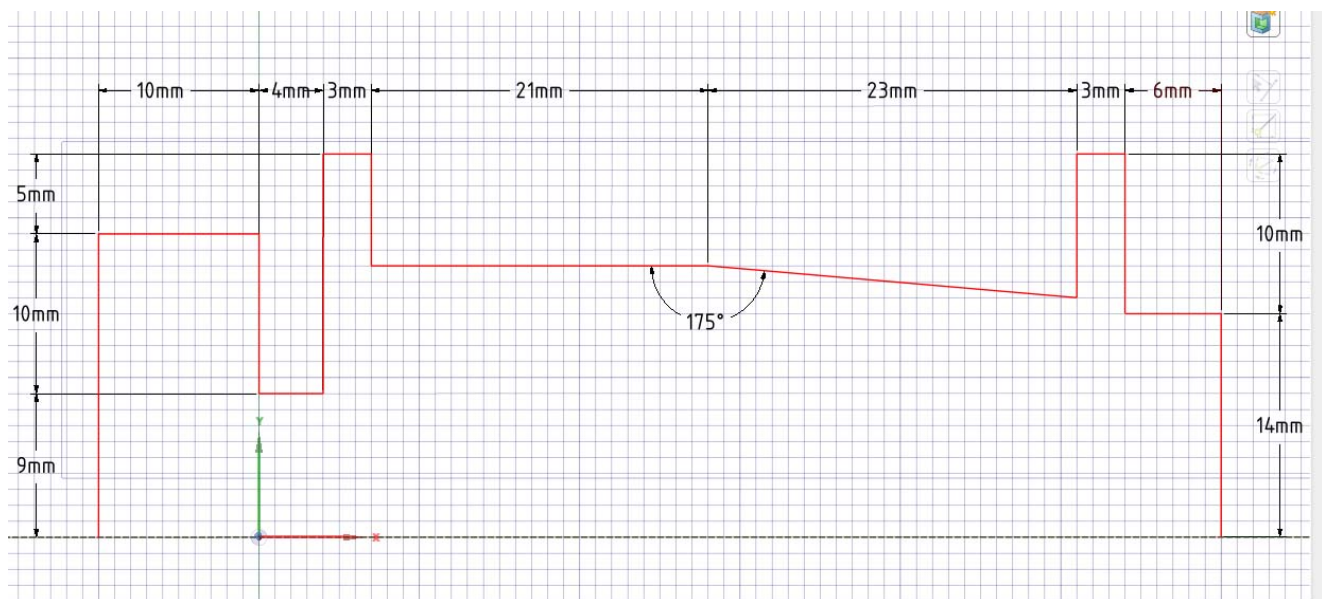
## Introduction

This is the second tutorial for basic operations in SpaceClaim. Please make sure you have completed Tutorial 1 before doing this tutorial, as it contains information you will require to complete this tutorial.

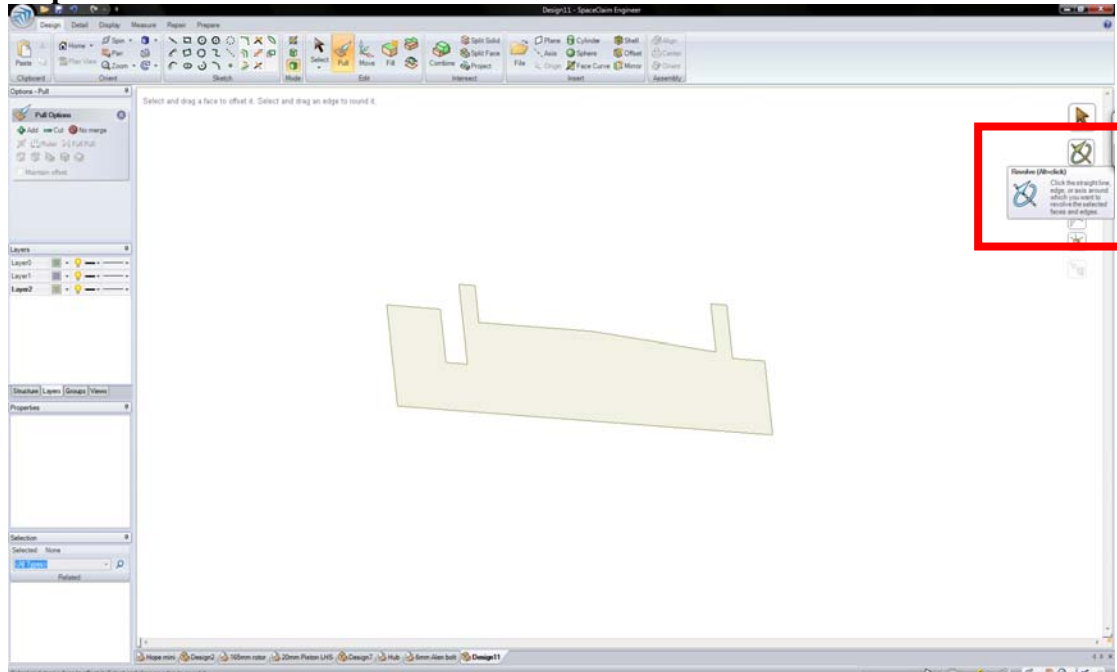
New commands that you will learn

- Revolve
- Creating an axis
- Pull “Removing Material”
- Create pattern
- Moving the anchor
- Move

Start of by recreating the below sketch.

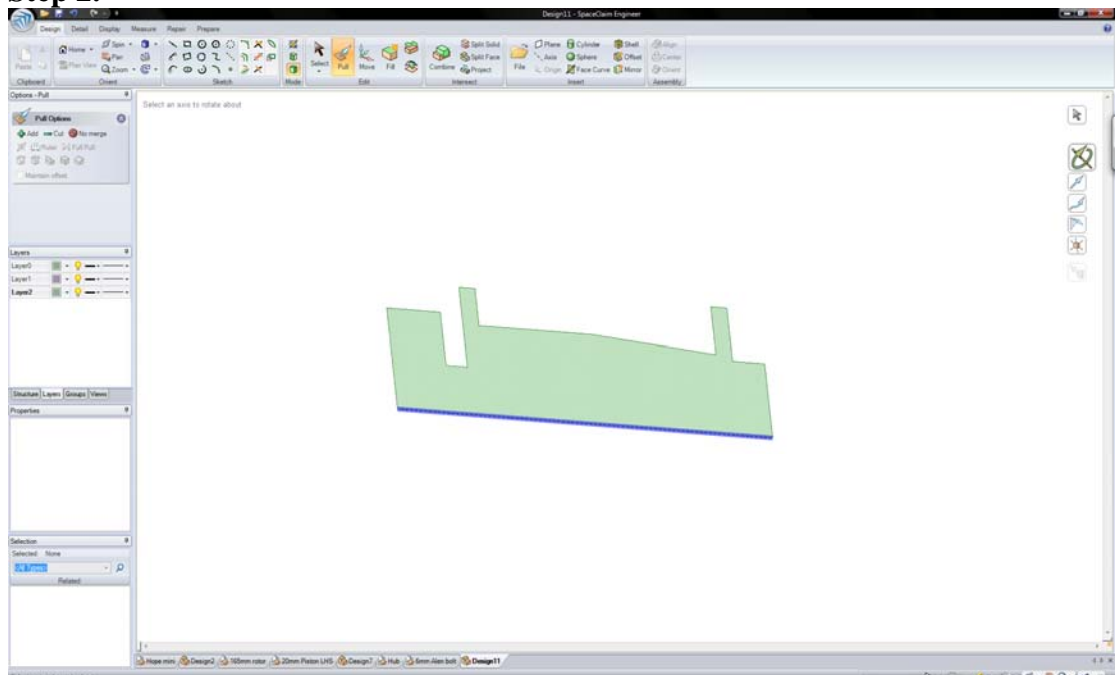


## Step 1.



The Sketch you just created is known as a **Profile**, these curves are what will give you the revolved shape you want. After the sketch is complete select **pull**, now look to the right side of the page and note the **Revolve** command, click on this

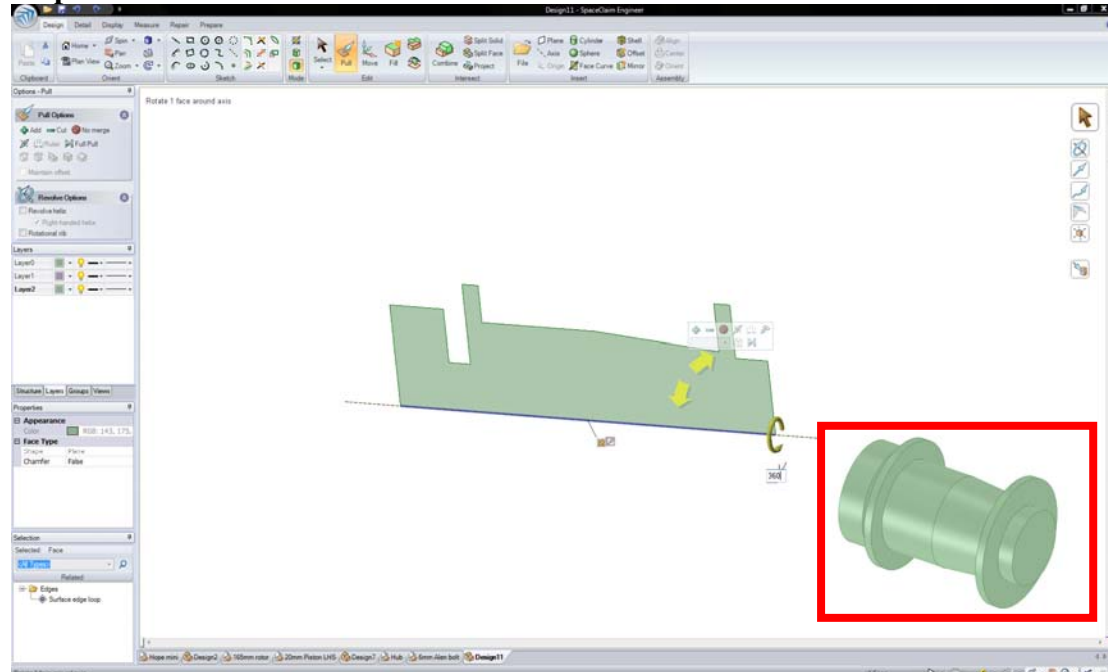
## Step 2.



You are now required to select the **Axis**; this is the line we want to revolve the **Profile** around. The line to select for the **Axis** is the one highlighted **purple**. If you cannot select the **Axis** you have probably missed it of the **Profile** sketch.

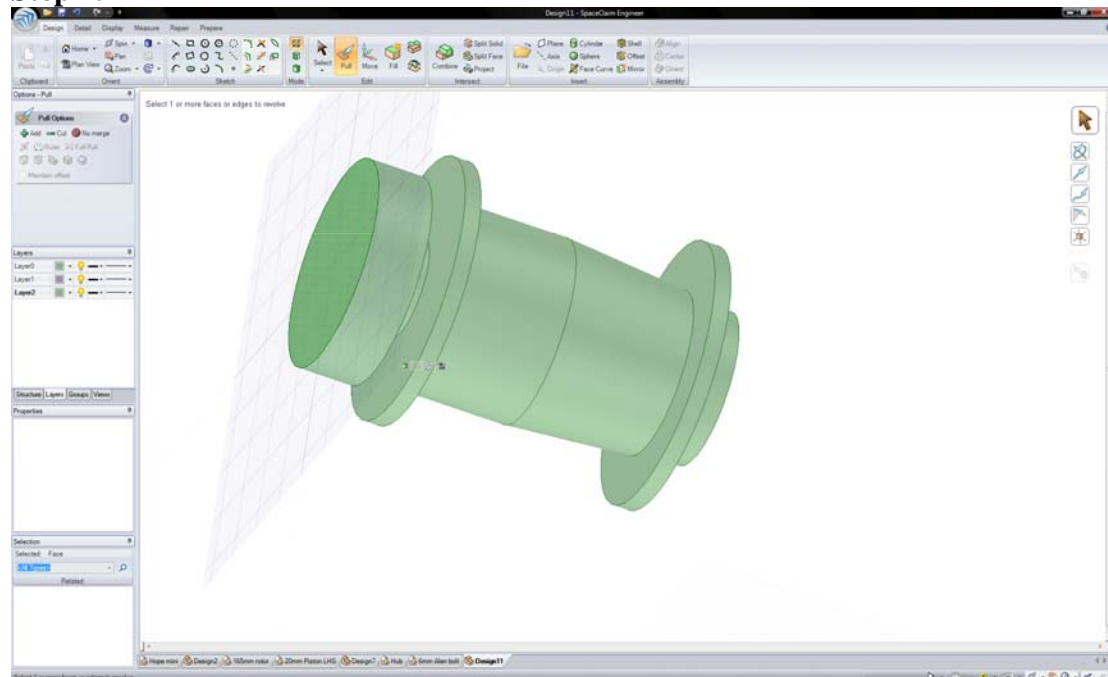


### Step 3.



Now you have the **Axis** Selected the next step is to click on the **Surface** you want to revolve, and hit **Spacebar** and type “360” and hit **Enter** the result is one complete revolution and will give you a closed object. See image in red box for the correct outcome. If you could not revolve make sure you selected the correct **axis** and selected a **surface** or **curves** to revolve.

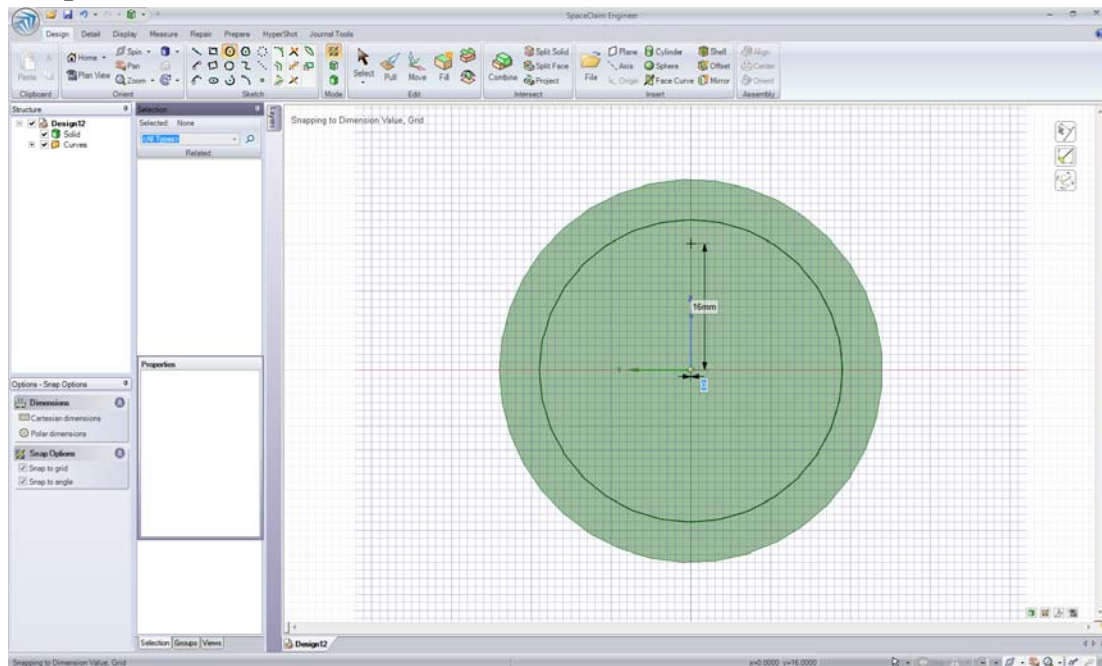
### Step 4.



Next is to create a pattern on the disc mount **Surface**, select the **Sketch Mode** icon and select the face as seen above and select the **Plan View** icon

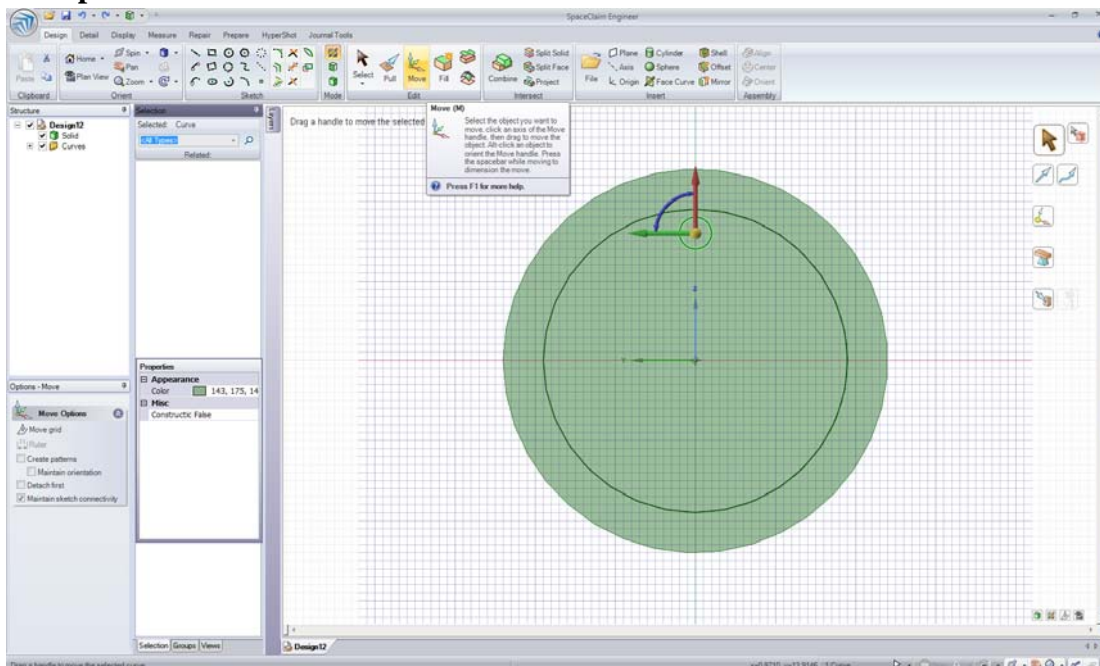


## Step 5.



Now select **Circle** from the sketch tab and using **Shift Touch** enter a distance vertically of “16” and horizontally “0”, and hit **Enter**, now hit **Spacebar** and type “4” and then **Enter**.

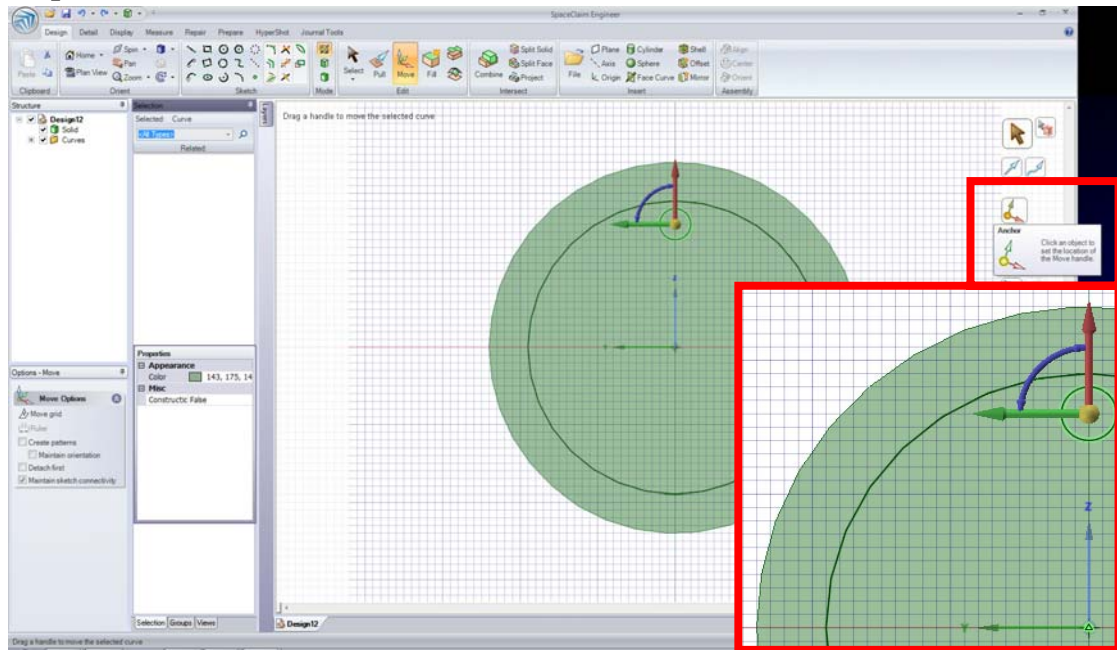
## Step 6.



The next step is to create a **Pattern**. Start by clicking on the 4mm **Circle** you just created making sure it turns a highlighted colour of the layer colour. Now Click on **Move**

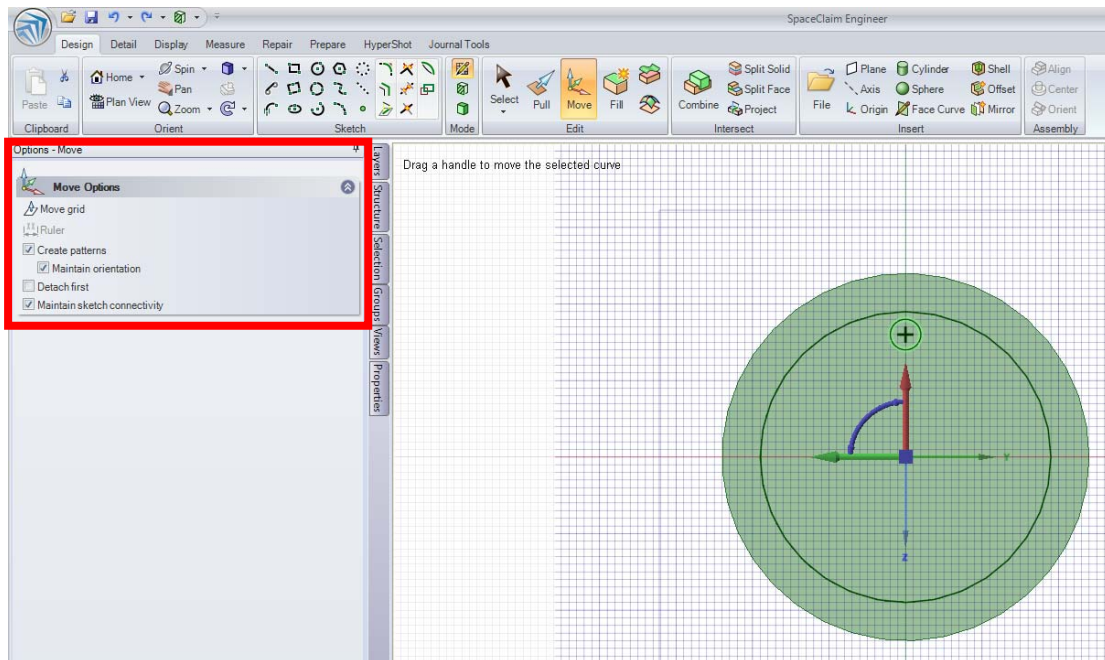


## Step 7.



You are now required to select an **Anchor** point which you will use to create the **Pattern** around. Click on the **Anchor** Icon as indicated by the smaller red box. The **Anchor** needs to be placed in the correct location, in this case it's the centre of the circle, so hover over the centre of the circle until it highlights and click, refer to image in larger red box for a visual guide.

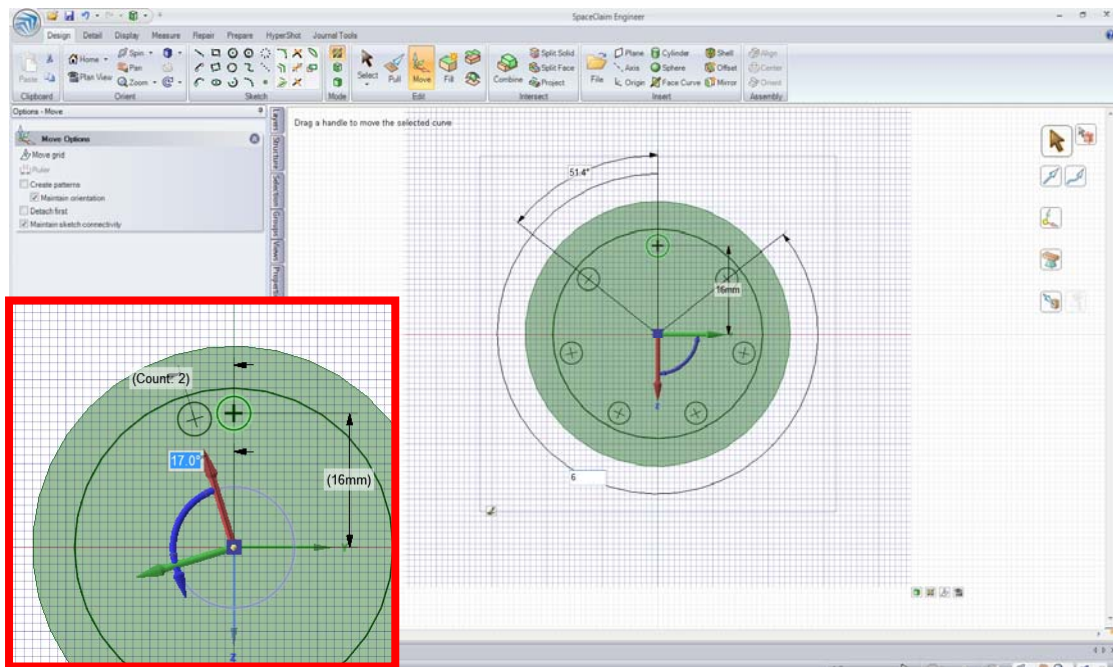
## Step 8.



Now look at the red box to the left of the screen, this contains **Move Options**, check the options for **Create Patterns** and, **Maintain orientation**. If you cannot revolve a pattern later on it is because these options are not selected as they deselect once the pattern is created.

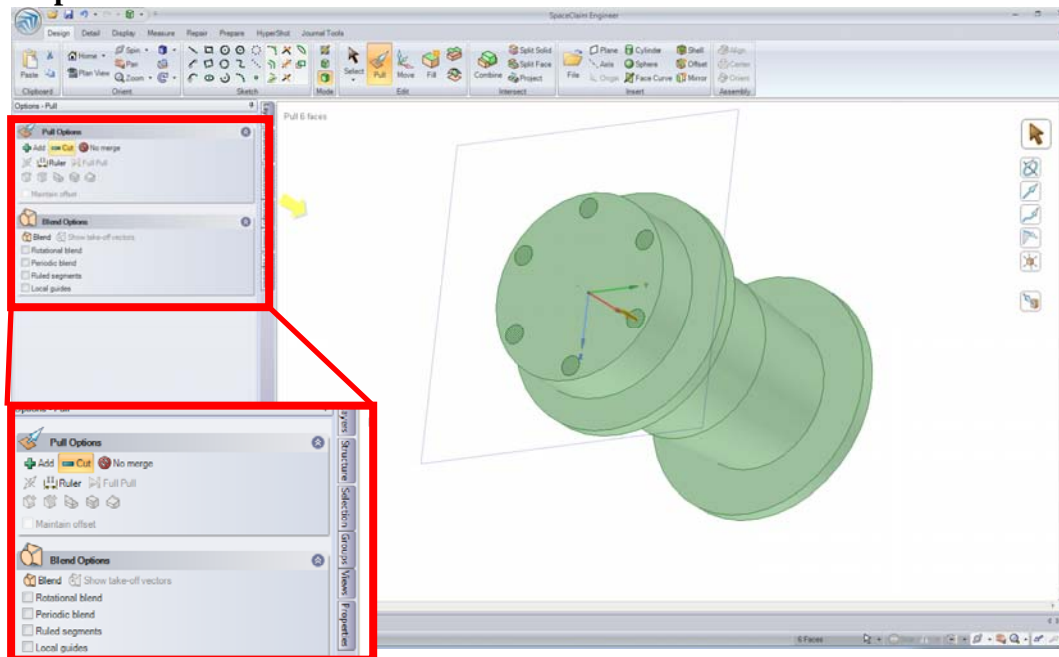


## Step 9.



Look at the Red box in the bottom left corner, Click and hold on the **Purple** Arched Arrow, now drag it in an Anti-clockwise or clockwise direction. You will notice it will start to look like the above screen shoot, release the mouse and then hit **Tab** until you are in the **Count** box and enter “6” and then **Enter**.

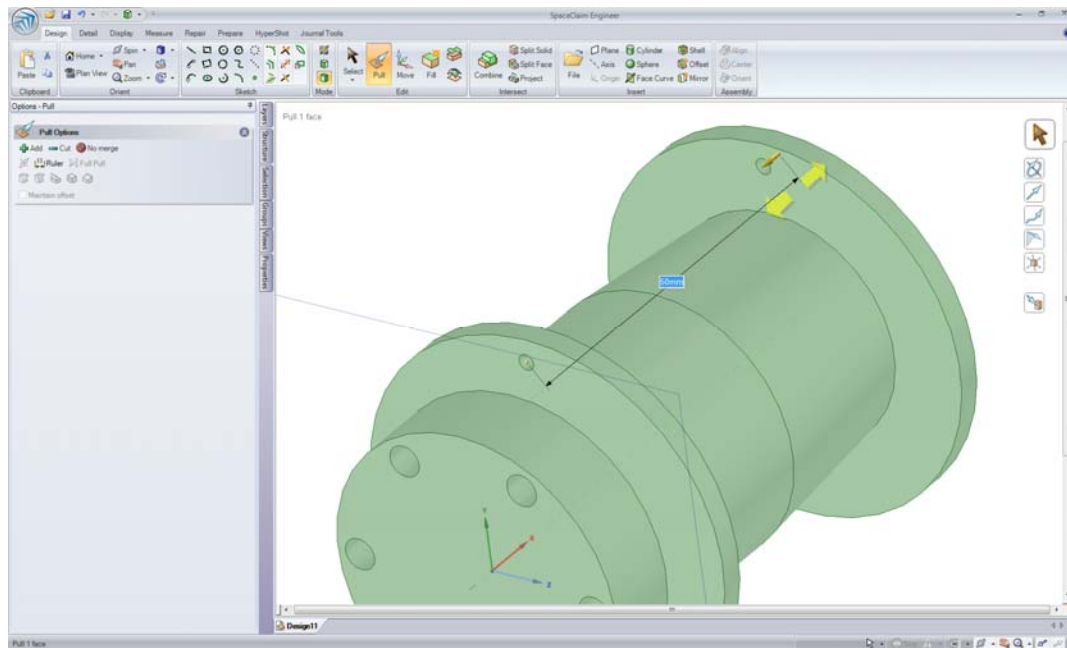
## Step 10.



You have used **Pull** to add material, now you will learn how to use it to remove material. Look to the top left of the screen, there are **Pull options**, “+” is to add, “-“ is to remove material. Click “-“, using **Ctrl** select the 6 circles and start to pull, hit **spacebar** type “10”. Now you should have 6 **Holes**

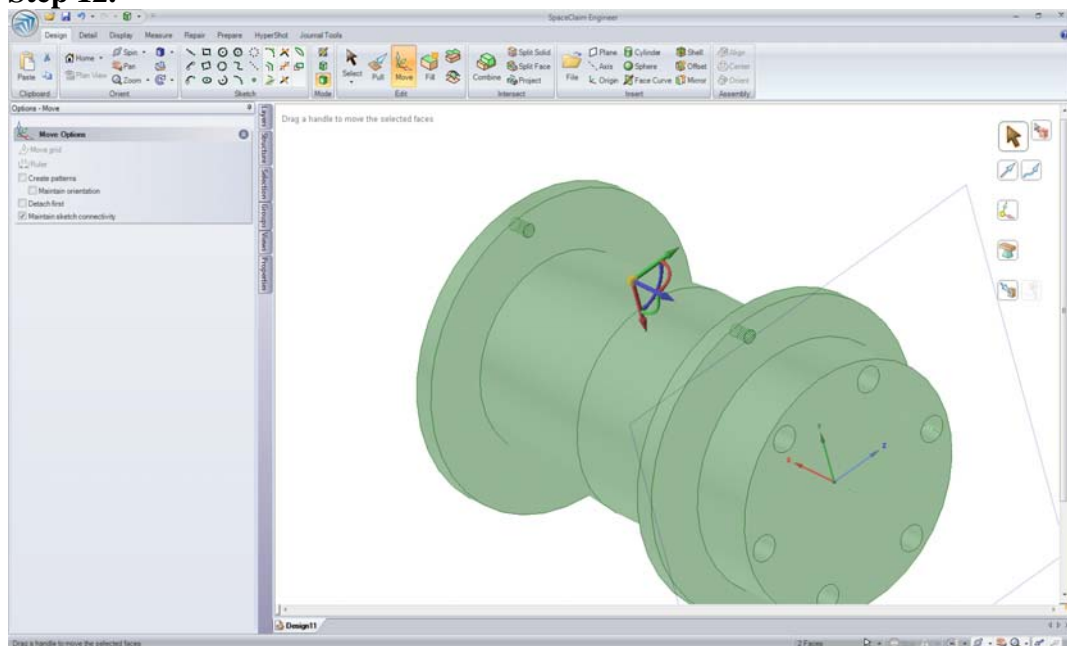


## Step 11.



The next step is to make the spoke **Holes**, as there is a high volume we will save some time. Replicate the above, the hole is 2mm and **Pull** the circle 50mm, it will remove material from both parts.

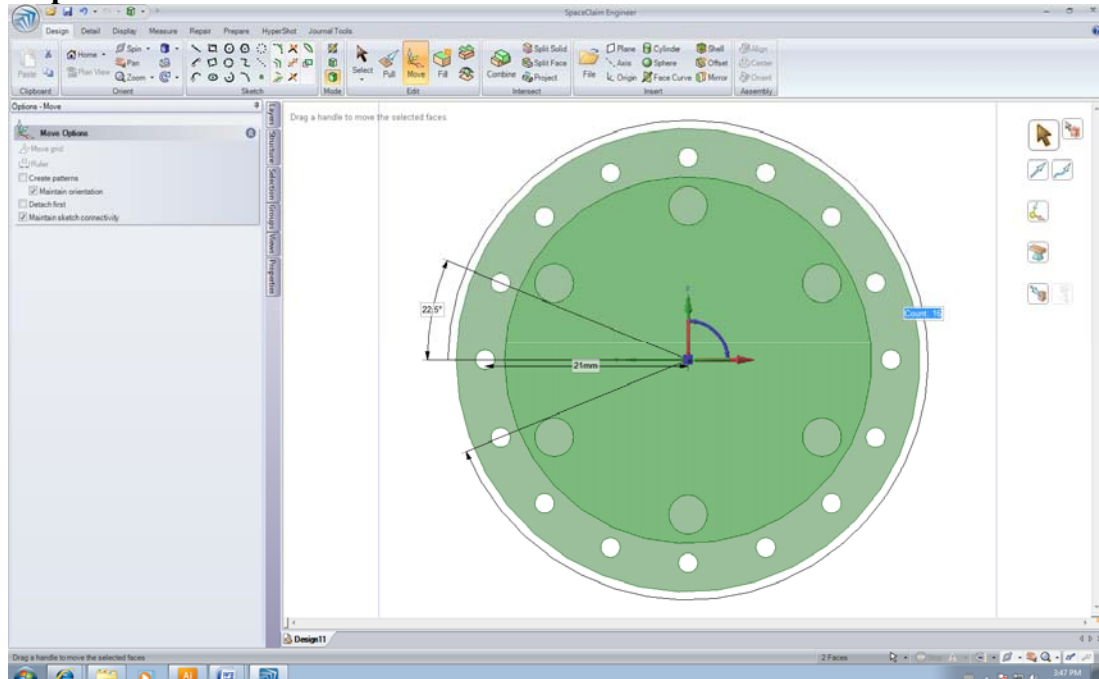
## Step 12.



Now Click on **Move** and using **Ctrl** Select both insides on the **Holes**.

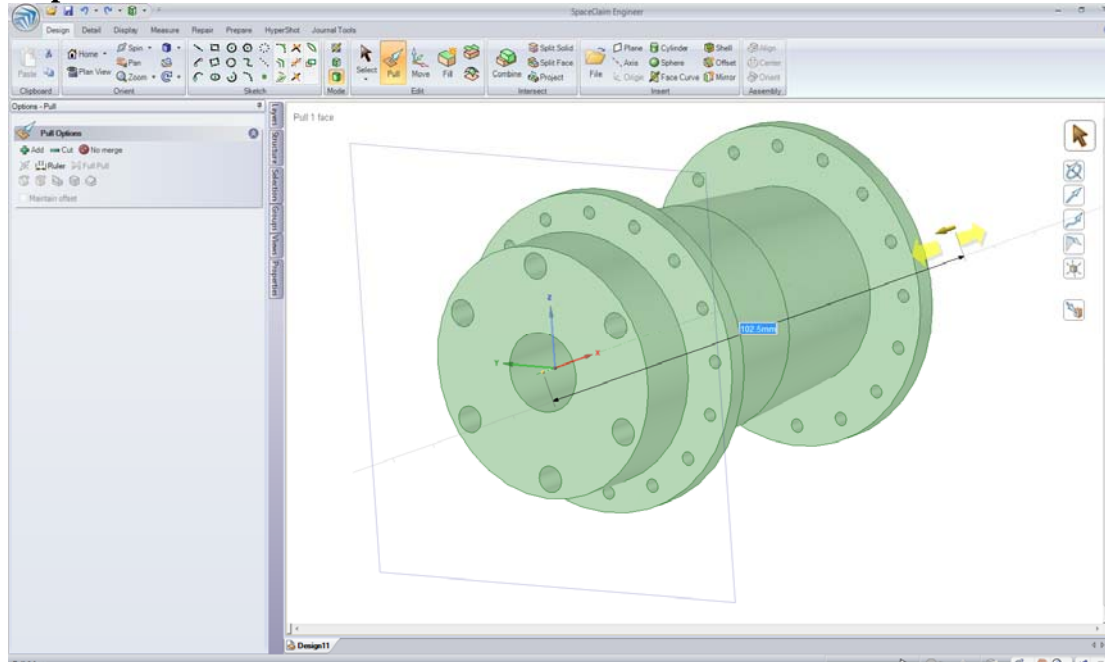


### Step 13.



It is the same process at steps 8 and 9., Make sure you have **Patterns** and, **Maintain orientation** selected and for the **count** use “16”. Notice how quick you have created 32 holes, and if you edit one they will all update.

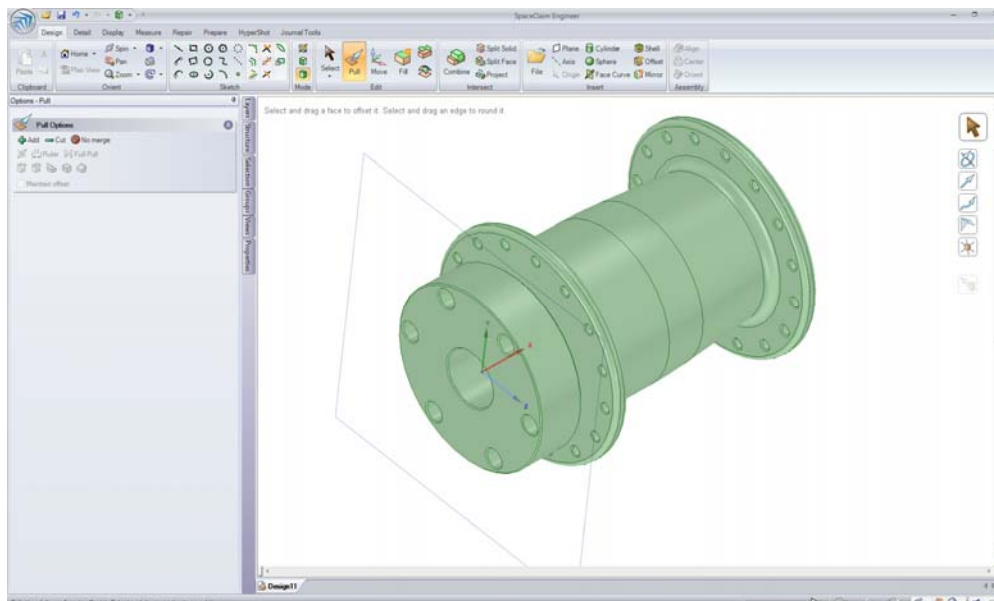
### Step 14.



The next step is to create the axel **Hole**, this can be drawn into the **Profile** but it is better practice to remove the material as it can easily be edited. Using sketch mode draw a **Circle** on the **Surface** you created the 4mm **circles** on, I chose 12mm for the **Circle**, and using the last process you learnt create the **hole**.



## Step 15.



Lastly add some fillets and chamfers, Refer to tutorial 1 for information.

**Please Note:** I highly recommend when creating multiple holes it save allot of time to create the hole and pattern the hole, rather than pattern a circle then selecting all the circles and removing the material. I showed you both ways so you can see how much time and effort can be saved.

