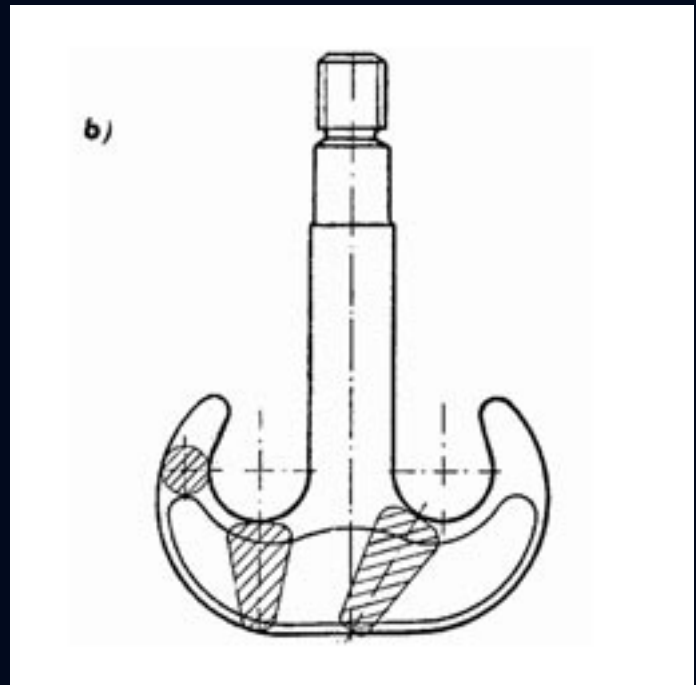


Modeling a heavy-duty crane hook

Hi there and welcome to another "quickie" tutorial. Now this time I've decided to show you how to model a heavy-duty crane hook and that's simple because I thought it is an inorganic form and object, it requires a little bit more imagination and skills than the previous tutorials. So this tutorial is here to teach you how to model something simple from a single blueprint, which I found on the net by the way, and I'll try to show you, what to do in areas which aren't that obviously visible in the blueprint. Again, to the right there is the final model which you'll end up with if you follow carefully ;-]

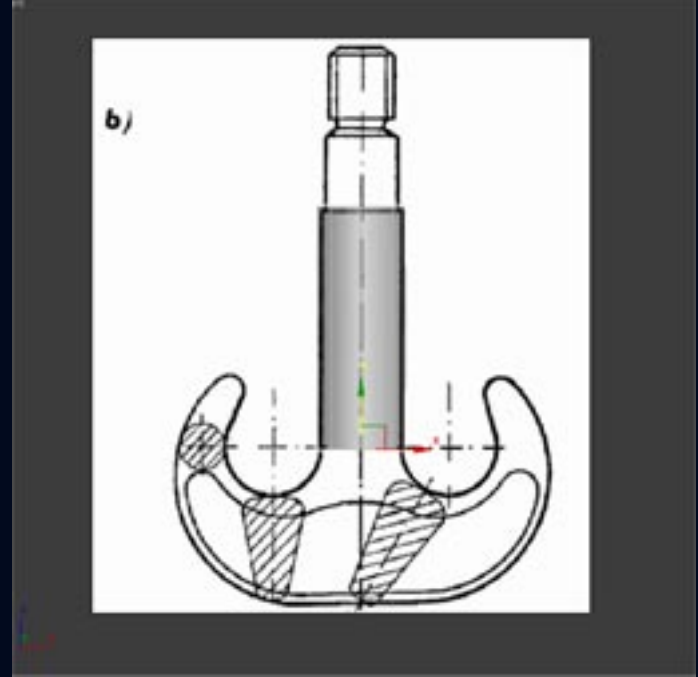
Before we start, download the scene and the blueprint [HERE](#)

The file is compressed using [WinRAR 3.30](#) and the model was made in [3ds max 7](#)

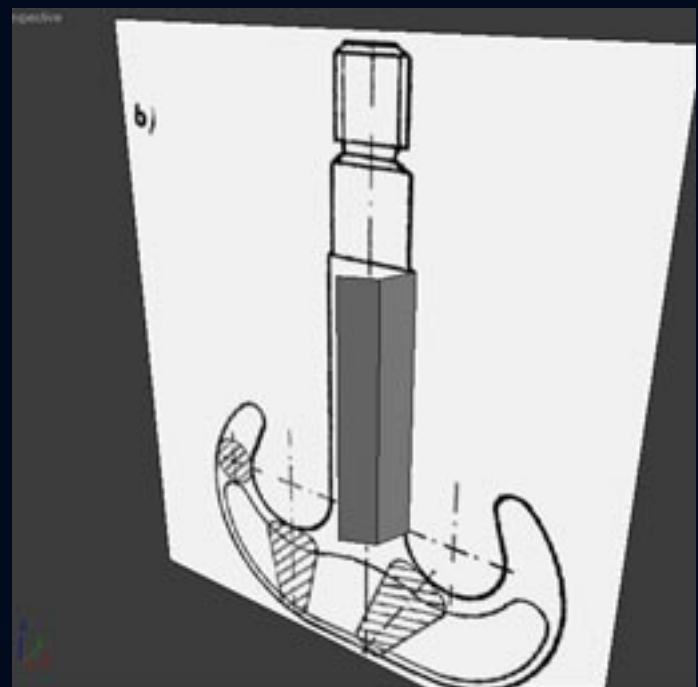


Ok, so this is the blueprint I was talking about. It's simple yet we have all the information we'll need to sculpt the object with maximum precision. Ofcourse it helps when you have some photos of the object you're working on to your disposal, but since I didn't find any suitable photos and also this is a very simple model to do, we won't need them.

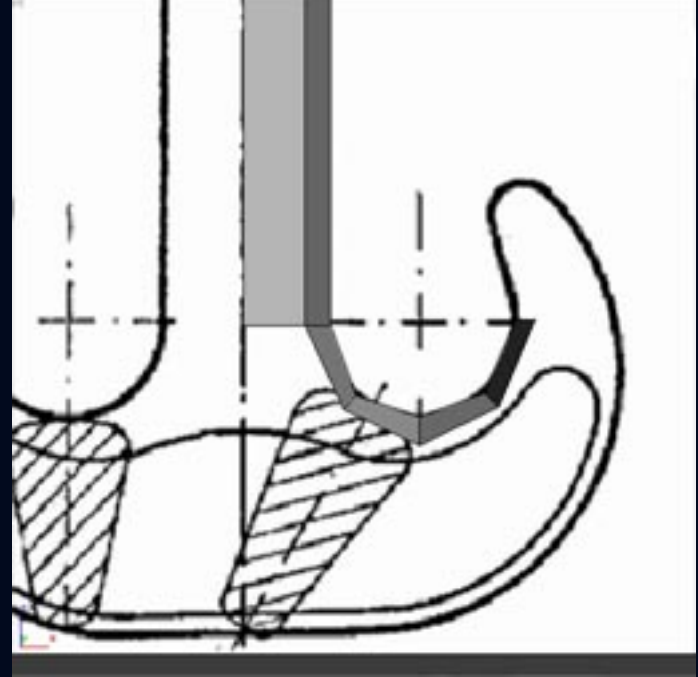
So, let's get started. On the illustration to the right I started with a **CYLINDER** with no height subdivision and with only **8** sides. Position the cylinder that the upper cap sits on the upper extrusion in the blueprint, just as on the picture to the right. Also, obviously, adjust its radius and convert it to **EDITABLE POLIES**.



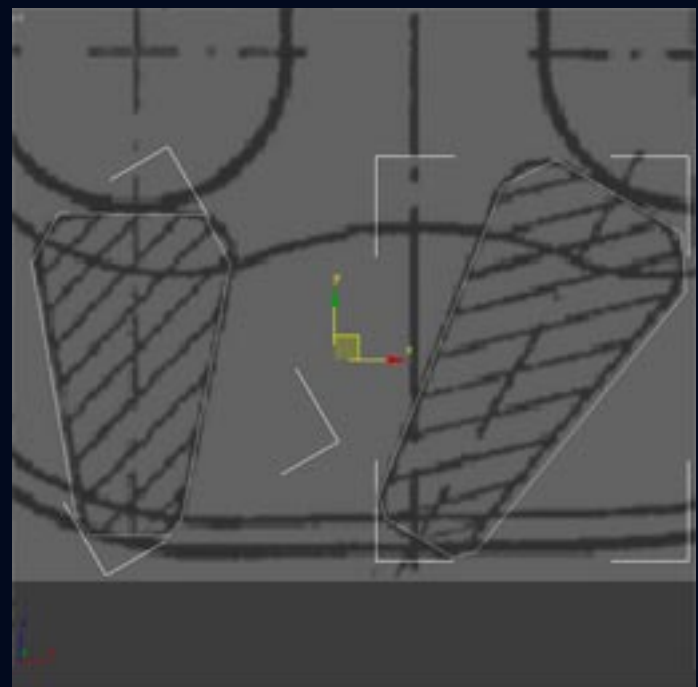
Since it's a regular and symmetrical object, we don't want to work on every side separately, that would be firstly a waste of time and secondly the model wouldn't look very good, it would be too assymetrical. So what you do, simply delete three quarters of the cylinder you created in the previous step. Just like on the picture.



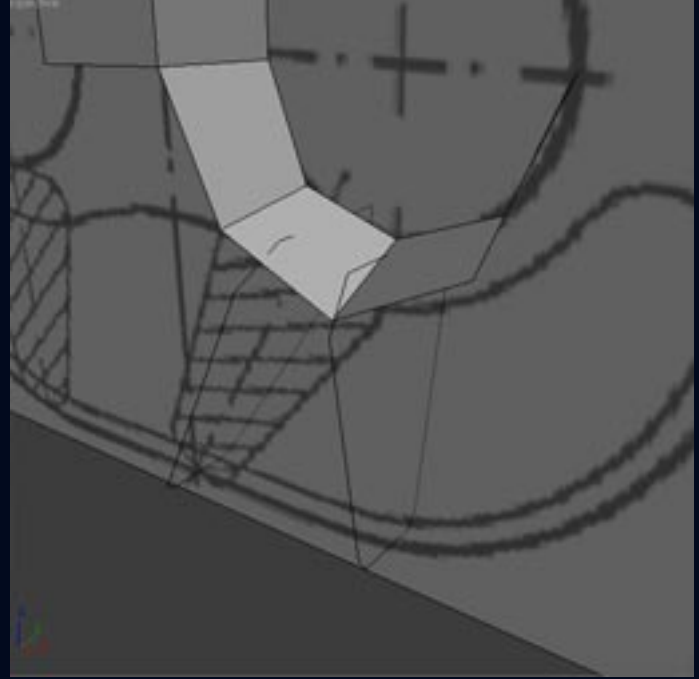
Now we can start "sculpting". Before I start explaining everything, I'd like to point out my technique. It's called **Face-To-Face** technique, it's very common, but to some, it might be uncomfortable, so when you get more skilled and confident, don't hesitate and try different techniques and simply pick the one which suits you best. Ok... that'd be it about the technique and back to the tutorial. As you can see on the illustration, I selected the **EDGE** on the model which is almost **PERPENDICULAR** to the **FRONT** view. And then, I simply **EXTRUDED** it (hold **SHIFT & DRAG**) 4 times along the hook's outline seen in the blueprint.



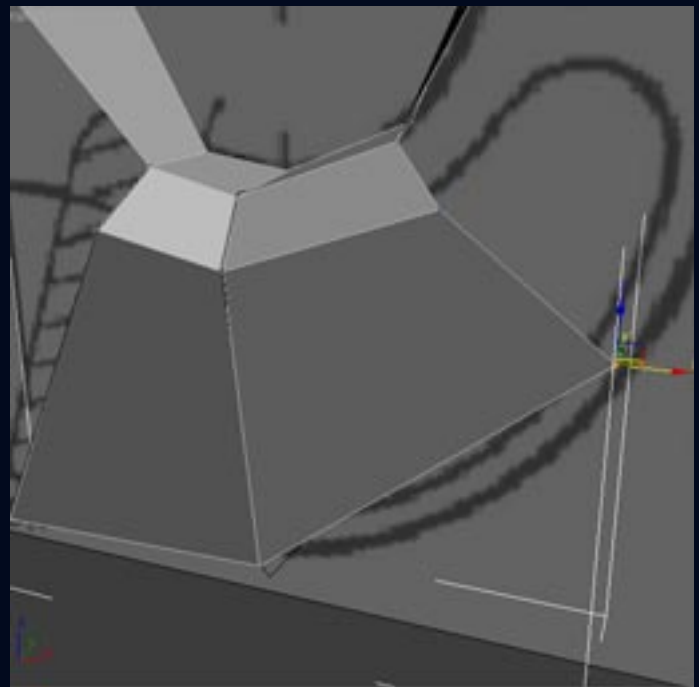
Now it is time to pay some more attention to the volume of the hook. As I mentioned before, the blueprint is really detailed enough to give us a good reference to get a good model. As you can see on the picture, I simply traced-off the outlines of the inner detail of the hook. Do the same thing using **SPLINES** and don't forget to turn off any additional details (like **INTERPOLATION STEPS** or **ADAPTIVE INTERPOLATION**) in the spline, we don't need it, it will only serve as a 3d reference.



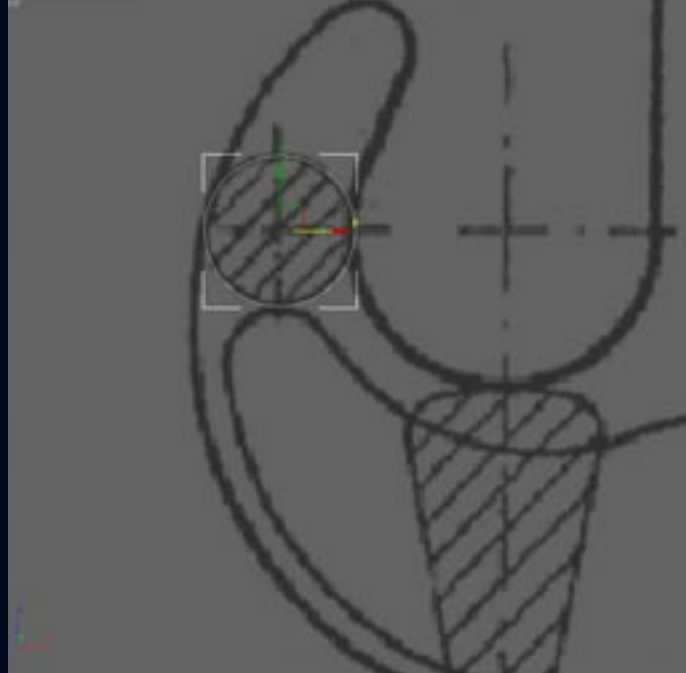
After you have traced-off the outlines, rotate them by **90** degrees along its local coordinate system and place them in their appropriate position. Simply the traced splines belong there, where they're marked in the blueprint, the only thing is that you have to rotate them and also place them on the same side of the model. The side you work on.



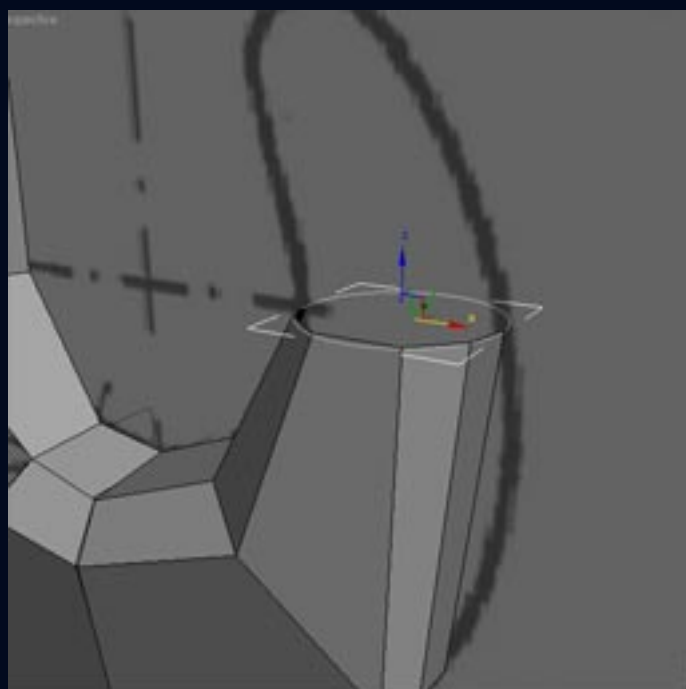
Now that we have our inner detail 3d blueprints placed properly, you'll see that it's much easier to navigate and orientate in 3d space when you have some guidelines to hold to. So, select the **OUTER TWO EDGES** and extrude them **2** times heading toward the lower part of the hook. Just like on the illustration to the right. Also try to position your vertexes according to the 3d guidelines you created.



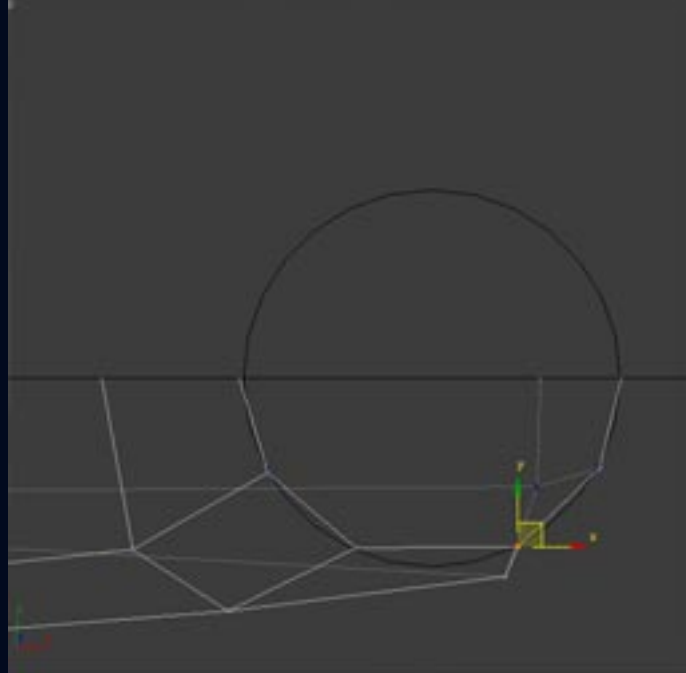
Again, we should trace-off another "clue" to help us with determining the hook's volume. This time it's the last inner detail we trace-off and it is the little circle on the left in the blueprint. So, trace it off and move it to the right and don't forget to rotate it by 90 degrees again.



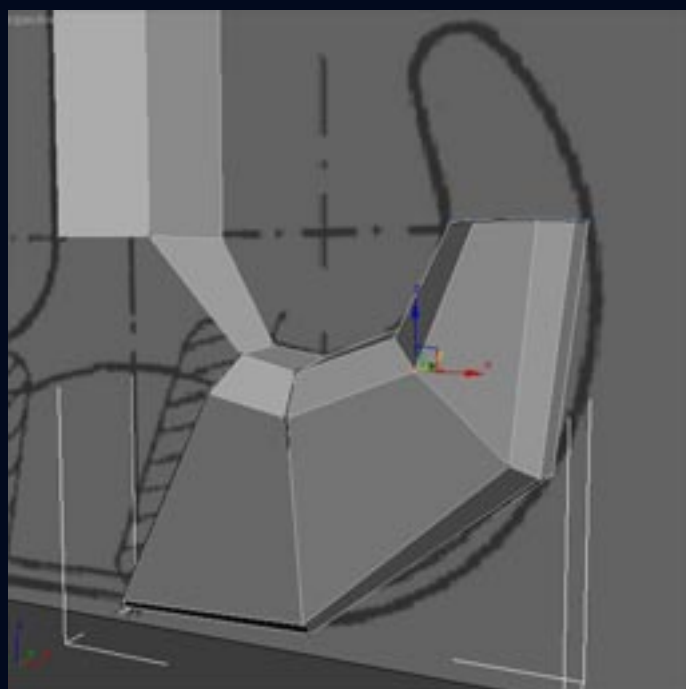
Once you have the circle in its appropriate position, you can start extruding the outer edges of the hook towards the circle as you can see on the picture. The circle will help us to keep the vertices evenly spaced in the 3d space so when we mirror the hook it should form a regular circular shape.



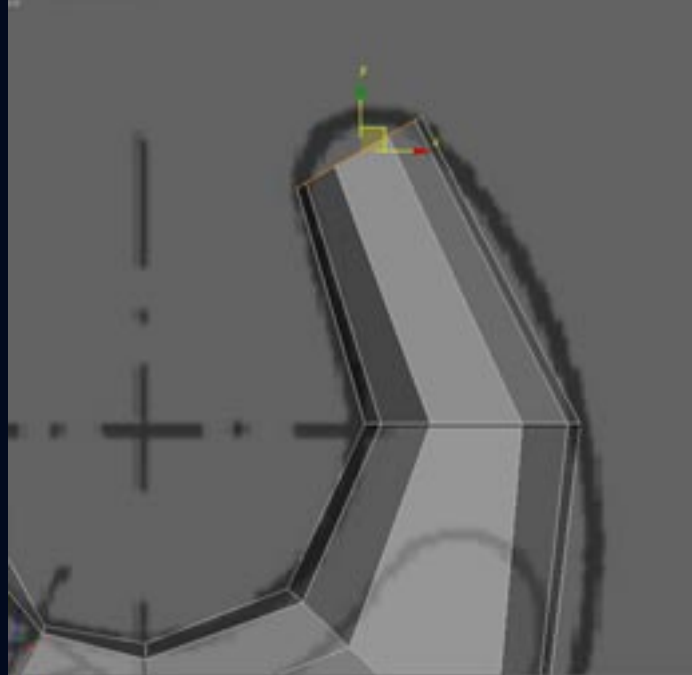
And this is exactly what I was talking about. Just position all the vertices so they're evenly spaced along the circle. I did this in **TOP** view with **WIREFRAME** display.



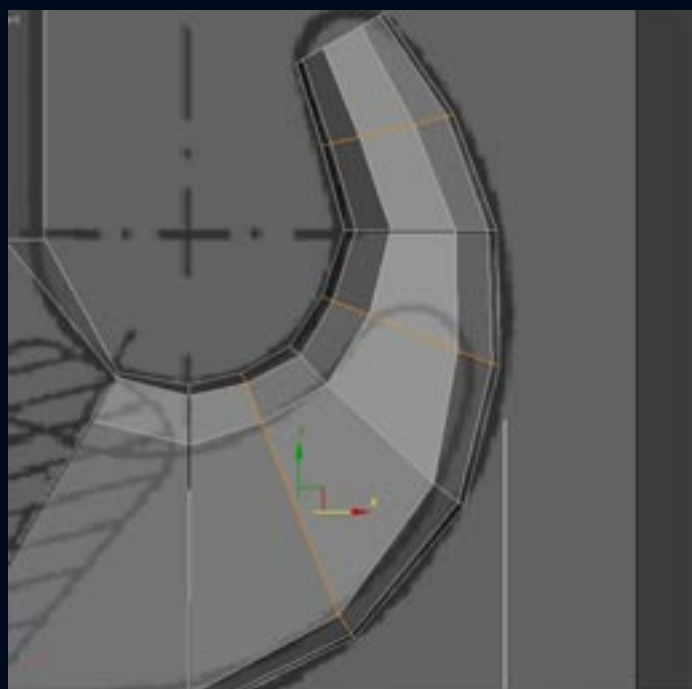
Now it comes to a little bit subjective and skill/practise demanding point. You have to preserve the correct volume of the hook, you do this by altering the vertices on the model's surface. This can't be properly explained nor shown, you just have to feel what's right and what's incorrect. Sometimes applying **MESHSMOOTH** helps to see whether you have the correct volume or incorrect one.



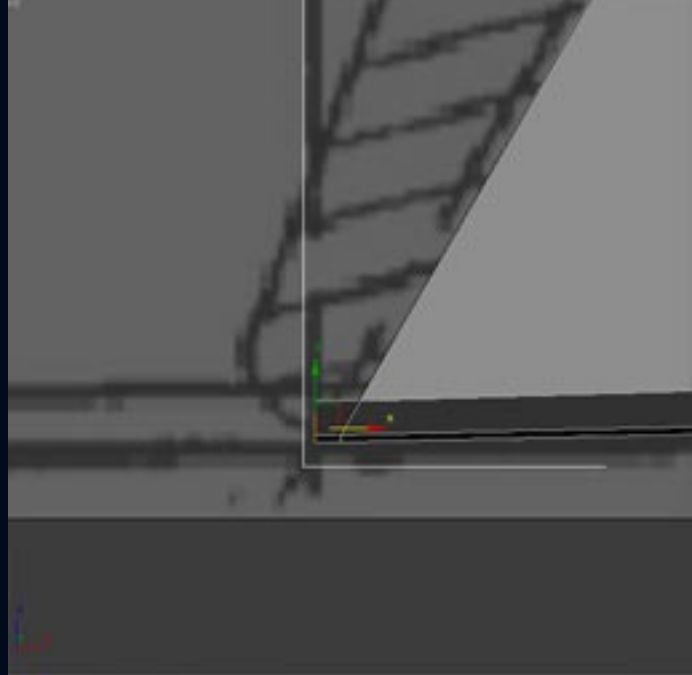
After you have altered all the vertices necessary, extrude the upper area of edges close to the tip of the hook. And again, position the vertices so that they correspond to the blueprint and also to the circular shape they have to form.



Now these areas on the image to the right needed more detail, so I simply used **CONNECT** function to add some more detail to it. Do the same thing and also position the newly created vertices in the correct place.

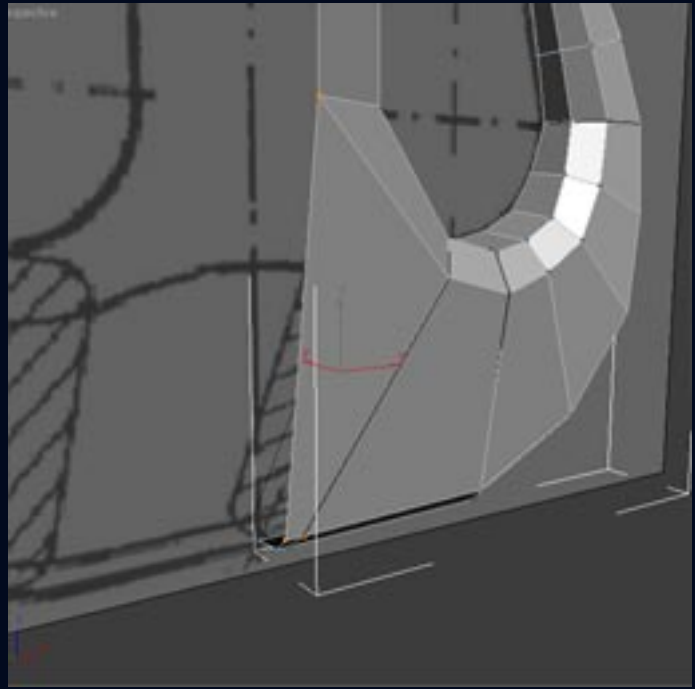


Ok, we have a very small gap between the center of the hook and the lower part of it. Just select the appropriate edges and extrude them towards the center of the hook. I also used the new aligning tools withing editable poly to align the vertices to their averaged center. Then just align the edges to the very center of the hook, so when you mirror the geometry you won't get any gaps.

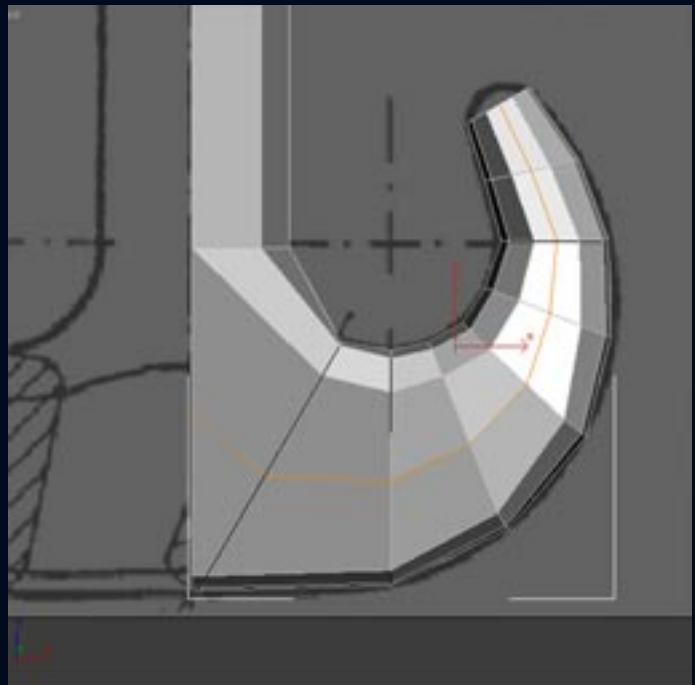


Modeling a heavy-duty crane hook

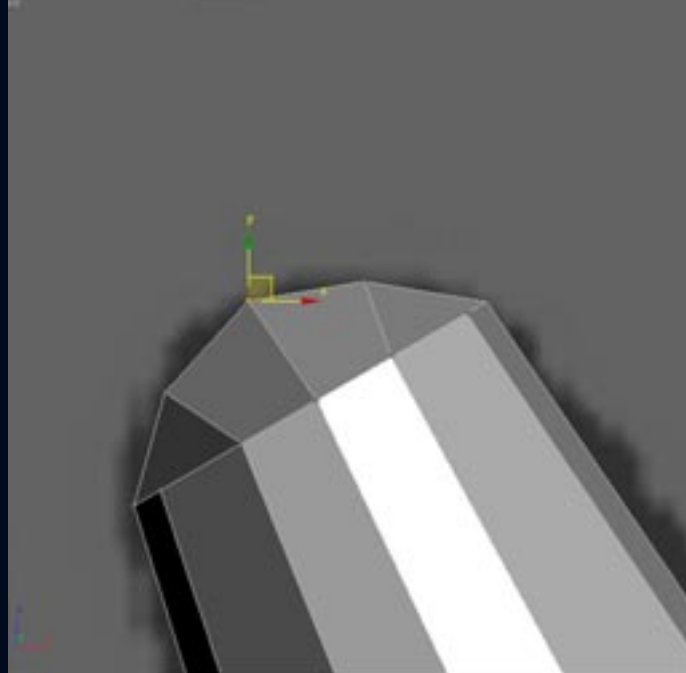
Now you have to **CREATE** a new **POLYGON** to get rid of the gap you had.



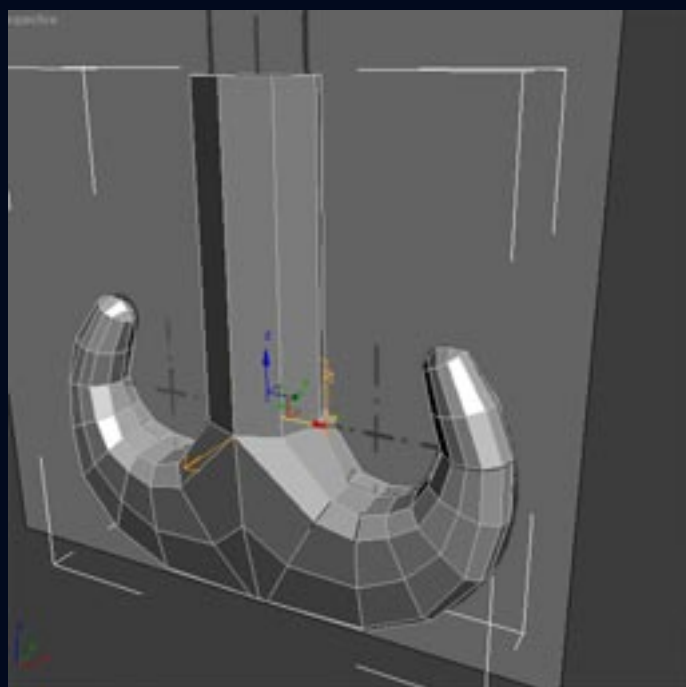
Ok, we're getting there. As you can see, we needed more detail on the side of the hook, so ring-select all the appropriate edges and **CONNECT** them. You'll also have to alter the position of the newly created vertices to preserve the correct volume of the hook.



Then move onto creating the tip of the hook. Simply create a single polygon connecting all the vertices and then use **CUT** tool to create such shape as on the picture.



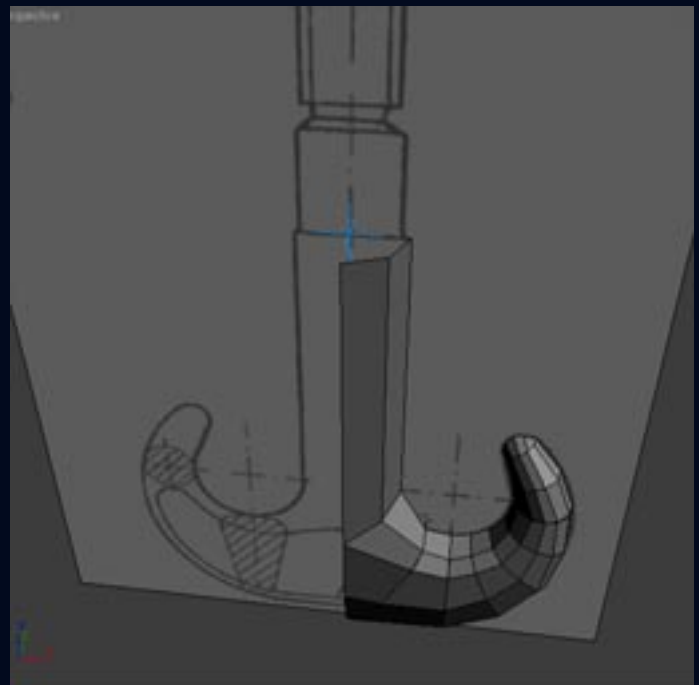
Ok, I think it is time to apply **SYMMETRY** modifier, in fact, you'll have to apply two of them to get the full body we want.



Just a test render of what we have so far.



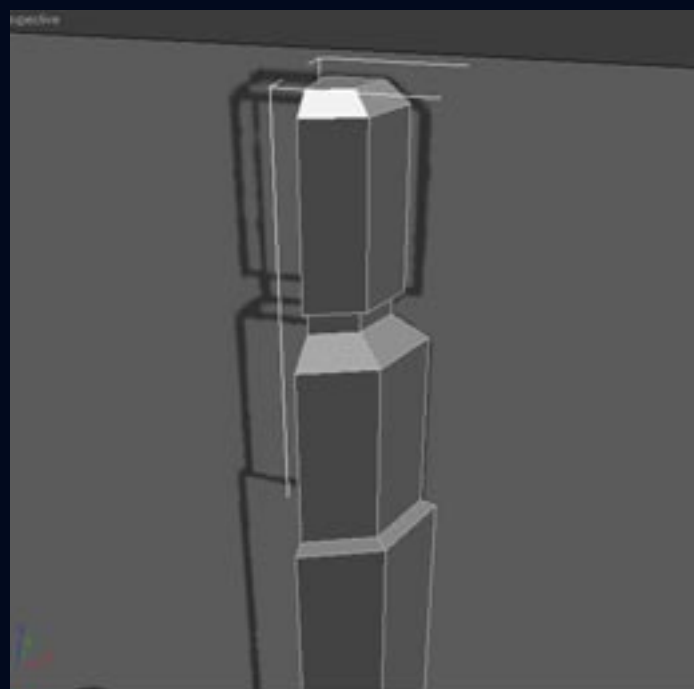
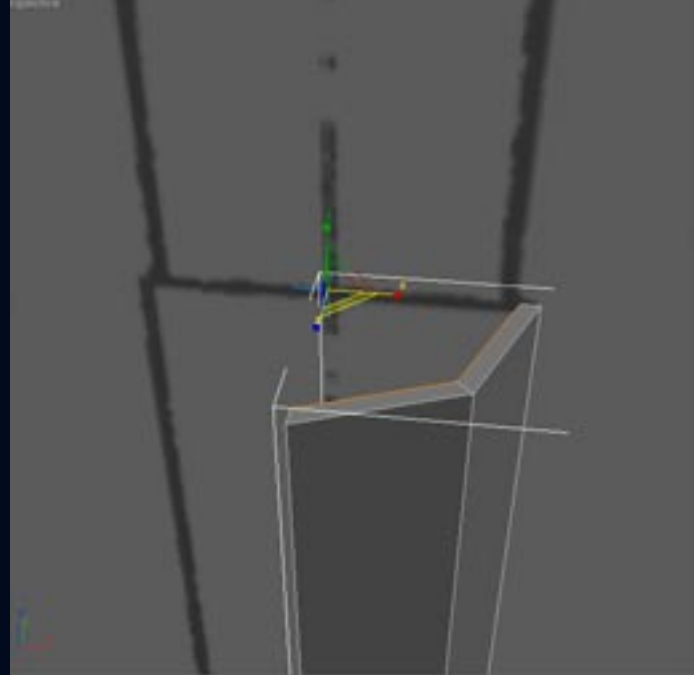
Ok, now turn off all the **SYMMETRY** modifiers, so we have a bit faster response and also it gets a bit easier to read the geometry in the viewports. Then create a **POINT** helper object and place it right in the very centre of the hook's middle neck. Also move it up so it's roughly in the same place as the highest edge on the hook.



The thing is, now that we have the helper placed in the very middle of the hook's neck, we can have it as our new local coordinate centre. This is especially useful when we work with regular, repetitive and mainly circular shapes. This way we use it as a centre of **SCALING**. So, select the two edges as seen on the picture and **SCALE** them towards the **POINT** helper.

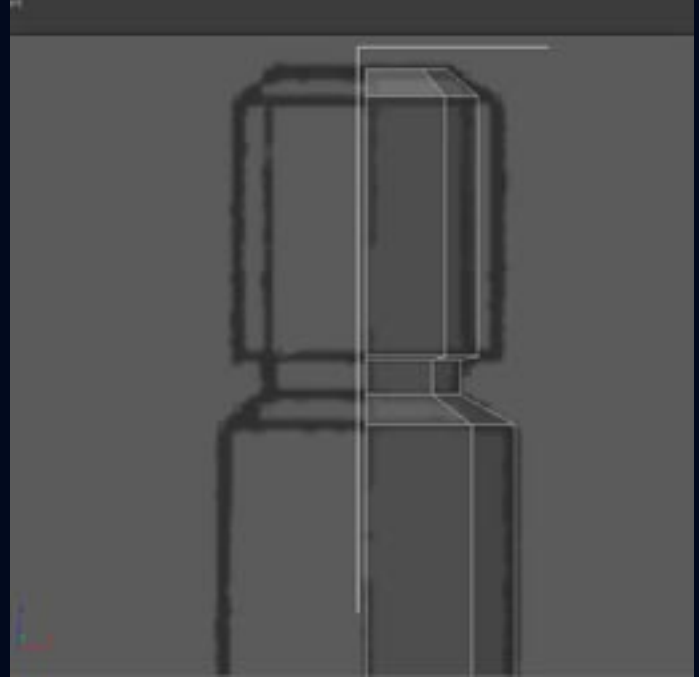
Note: to get the scale gizmo to be placed on the point, you need to change your **REFERENCE COORDINATE SYSTEM** to **PICK**, then select the **POINT** helper and then you have to **USE TRANSFORM COORDINATE CENTER** located right to the right of the **REFERENCE COORDINATE SYSTEM** rollout menu.

Ok after this, just hold down **SHIFT** and **SCALE** down the two selected edges and you get the same result as on the illustration to the right.

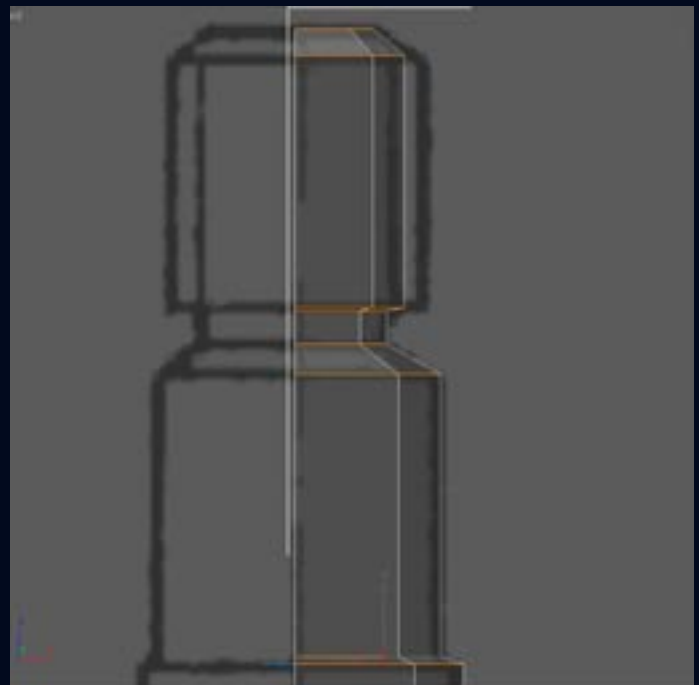


Repeat extruding and scaling the edges according to the blueprint til you get to the top of the hook.

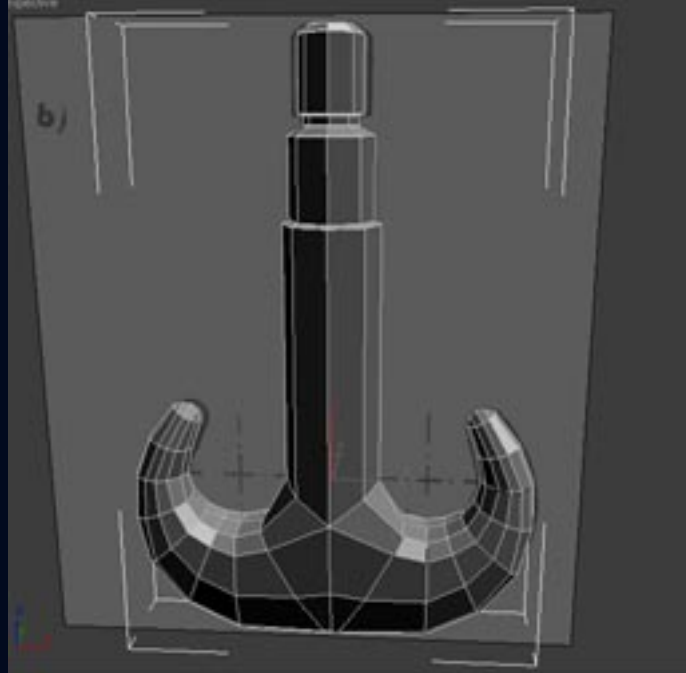
Just another view at the result you should have by now.



Now, select all the edges that have to be sharp after meshsmoothing, the ones that are selected on the picture, and **CHAMFER** them by a very small value.



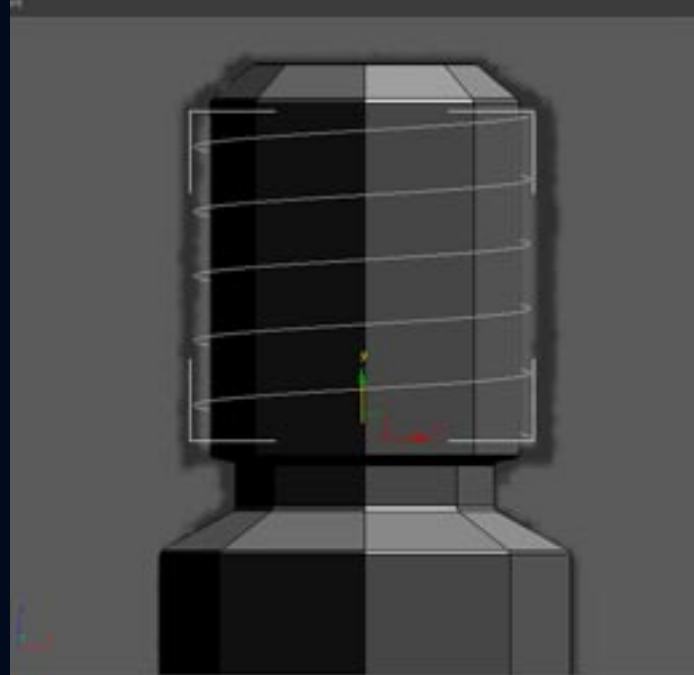
Ok, so this is what you should have after turning the **SYMMETRY** modifiers back on.



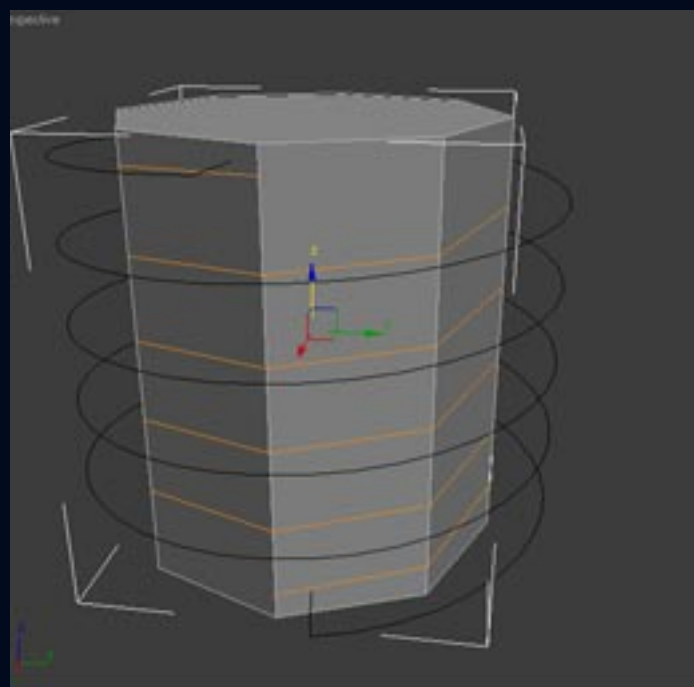
Just a quick test render. I tend to do lots of test renders so I can later on, when I get back to the project, see my progress and also eventually imperfect areas which need more work.



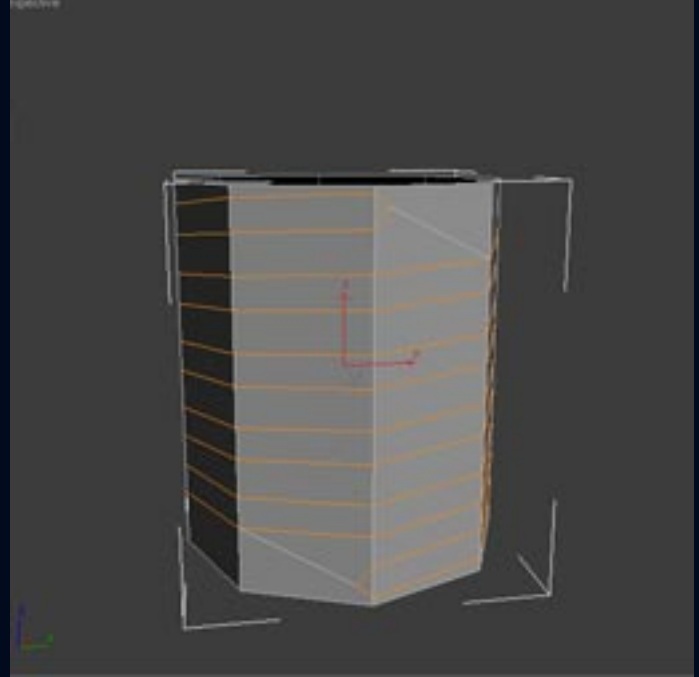
Ok, now, all we have to do is the upper part of the hook which I think is the most difficult on this project. So as you can see, I've created a **HELIX** to have some reference in 3d for creating this part.



For the sake of getting this area right, I created a new **CYLINDER**, which I converted to **EDITABLE POLIES** and I hid all the other objects except for the **HELIX**. I tried **SHAPEMERGE**, but first of all it didn't work and secondly, if you are familiar with this compound object, you know what mess it causes afterwards, so, don't use it in this case. Rather use **FRONT** and **BACK** views and the **CUT** tool to cut the **HELIX** into the mesh. It's very straight forward and intuitive, it needs no more explanation in my opinion.

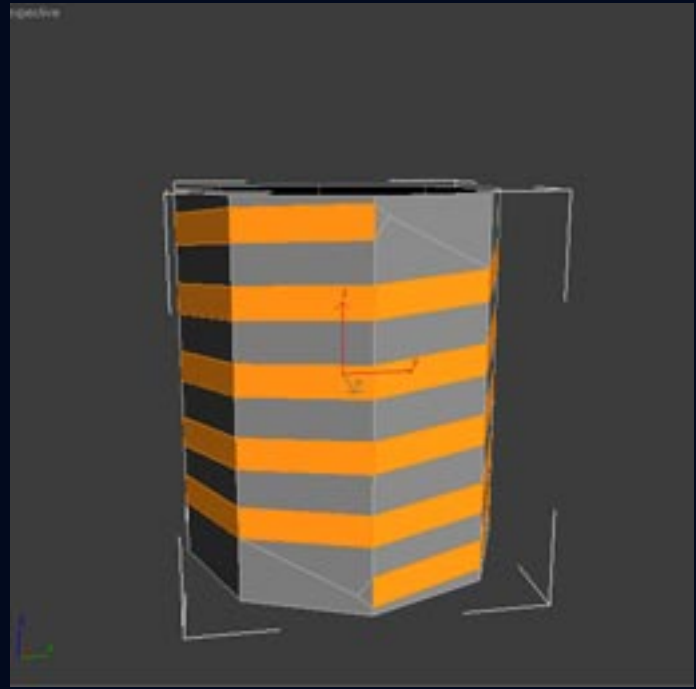


After you've cut everything correctly into the mesh, select the newly created **EDGE-LOOP** and **CHAMFER** it. You should get the same result as on the picture. If not, make sure that the **EDGE-LOOP** is continuous and has no unnecessary vertices etc...

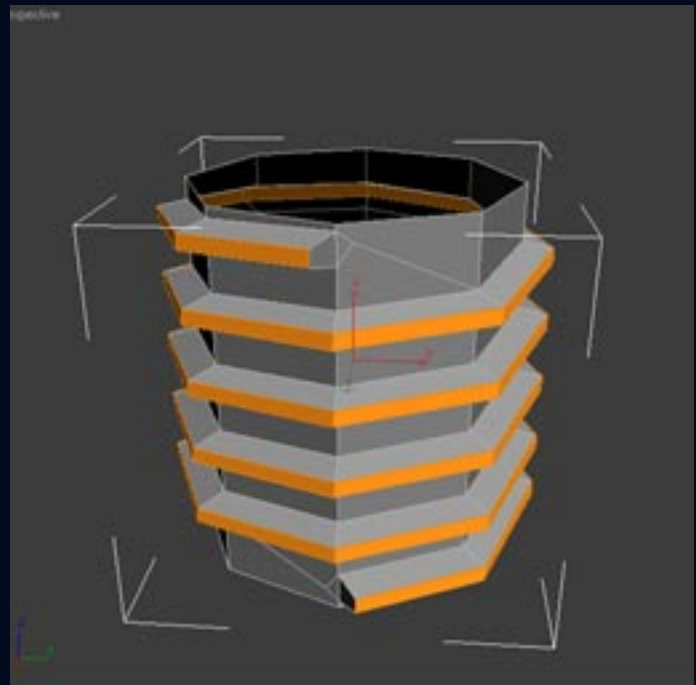


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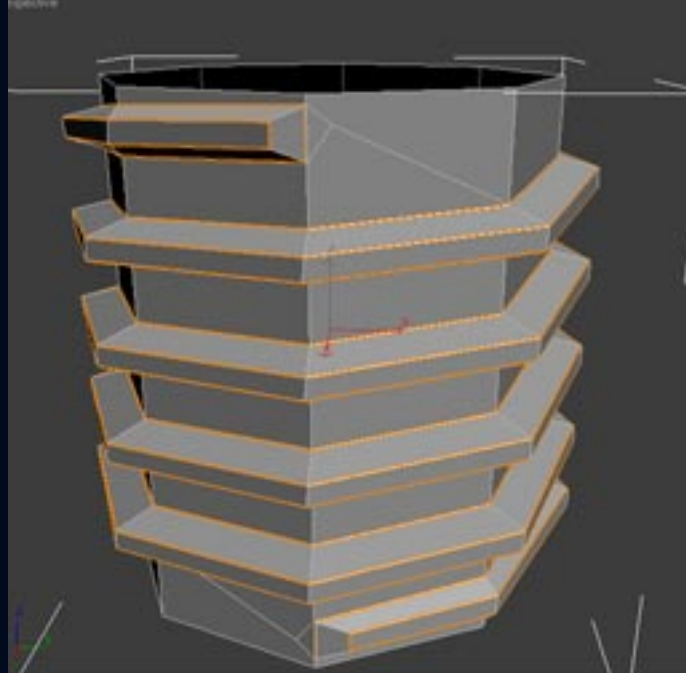
After chamfering, just select the newly created **POLYGONS** except for those ones at the both ends = the ones that form a triangle.



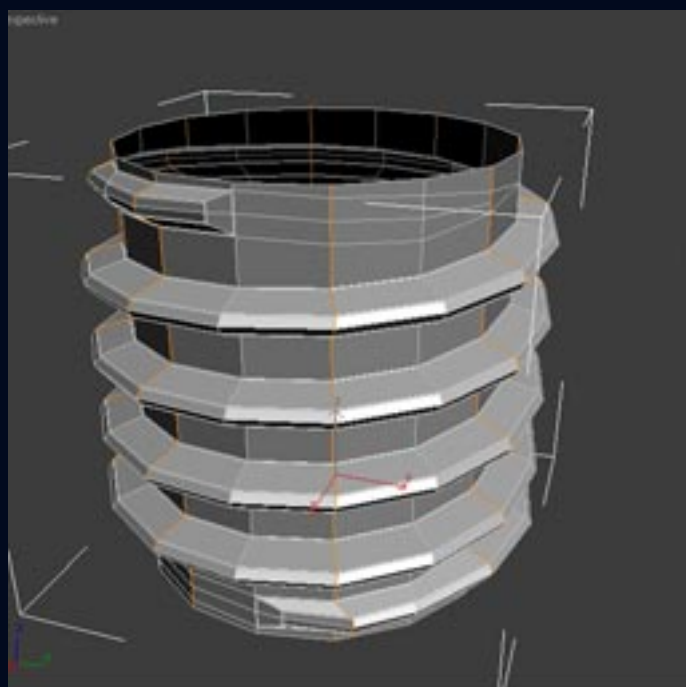
Now simply **BEVEL** the selected **POLYGONS**.



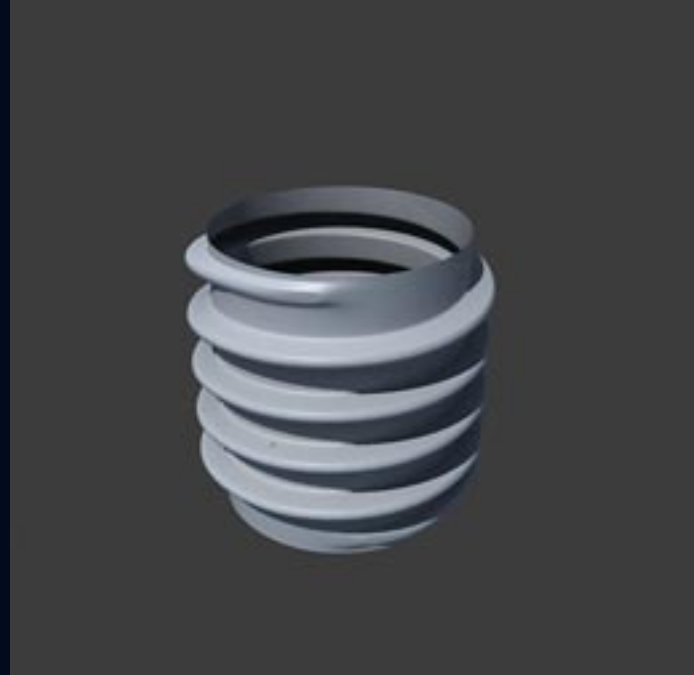
Select both **EDGE-LOOPS** on top and bottom of the extruded polygons and **CHAMFER** them a little bit.



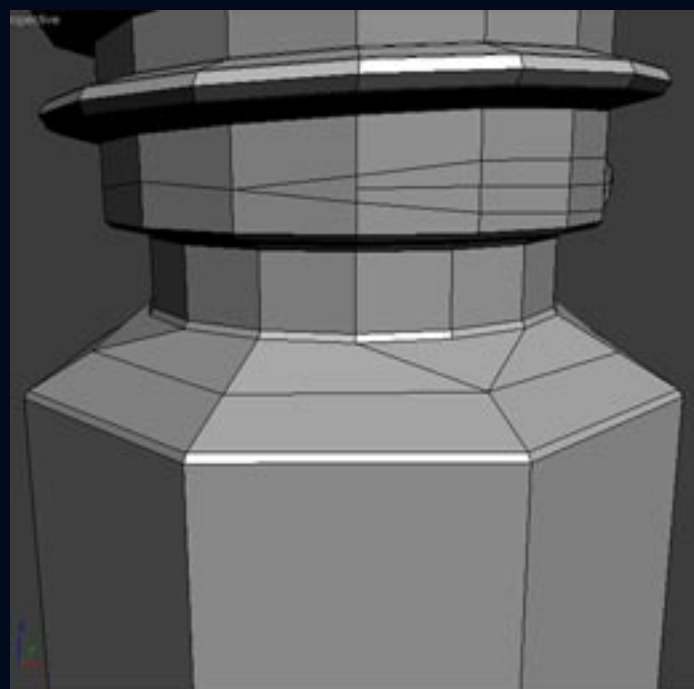
On this picture I did a bit more steps than usual, but they should be very obvious and intuitive. I remodified the endings of the extruded helix so it's much less messy, I also added a middle **CONNECTION** to the helix and scaled it up a little, so we don't get a very hard edge after meshsmoothing. And finally I added new sides to the whole cylinder and scaled them up so they form a regular cylinder again, you can see these edges still selected on the picture.



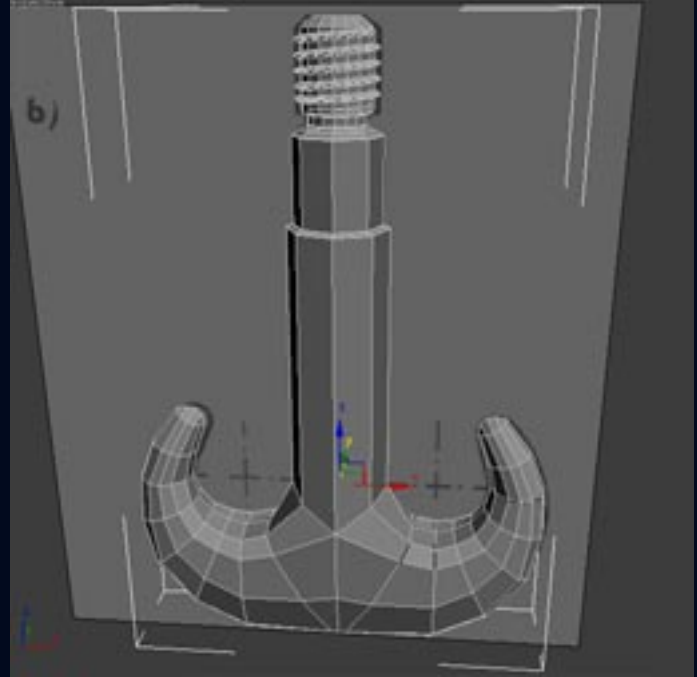
Another test render just to see how the smoothing works. I think it's good enough. Maybe the endings need a little bit more work, but hey... ;-]



Ok, so all we need to do now is to connect the upper part to the body of the hook. To do so, we first have to get rid of the original geometry there by deleting it and also to add some more details to the neck of the hook. Simply "copy-cat" what I have on the illustration to the right.



THAT'S IT! :-] Congratulations!



Ok, this is the final test render, all it needs now is UV mapping which shouldn't be that difficult to get since the model is not extra-over-detailed, but since this was supposed to be a modeling tutorial I won't go into unwrapping the model, maybe sometime later, some different tutorial... So, I hope you've learnt something new and that this tutorial has been helpful/useful to you and also please feel free to drop me a line if you get stuck somewhere or if you just want to say hi ;-] at

loocas@duber.cz



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