How the Sketch Work with the Modeling of Free-from in Rhino for Product Design.

How to build simple frame model for aiding sketch?
How to import sketch into Rhino and match scale?
How to build the free-form by referring the sketch in the Rhino?

Sketch and Modeling procedure for free-form in Rhino

Build 3D framework in Rhino

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Export images for sketch.

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Draw sketch in other software.

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Import sketch images and caliber in Rhino.

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Create and edit plane outlines.

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Draw 3D curves.

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Create basic surface.

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Build detailed surface.

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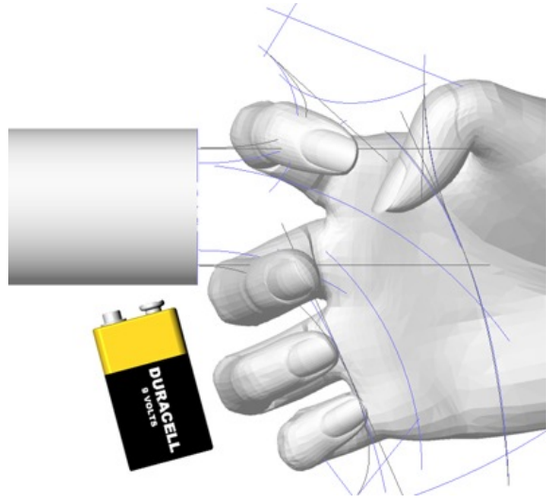
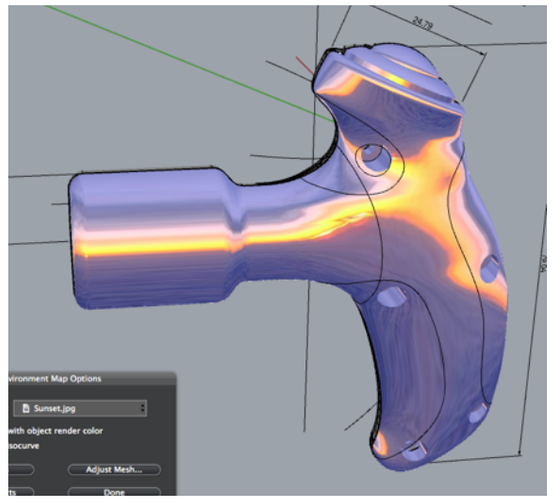
Re-sweep or rebuild surface.

depend on the complexity of your model





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Build 3D for scaling reference

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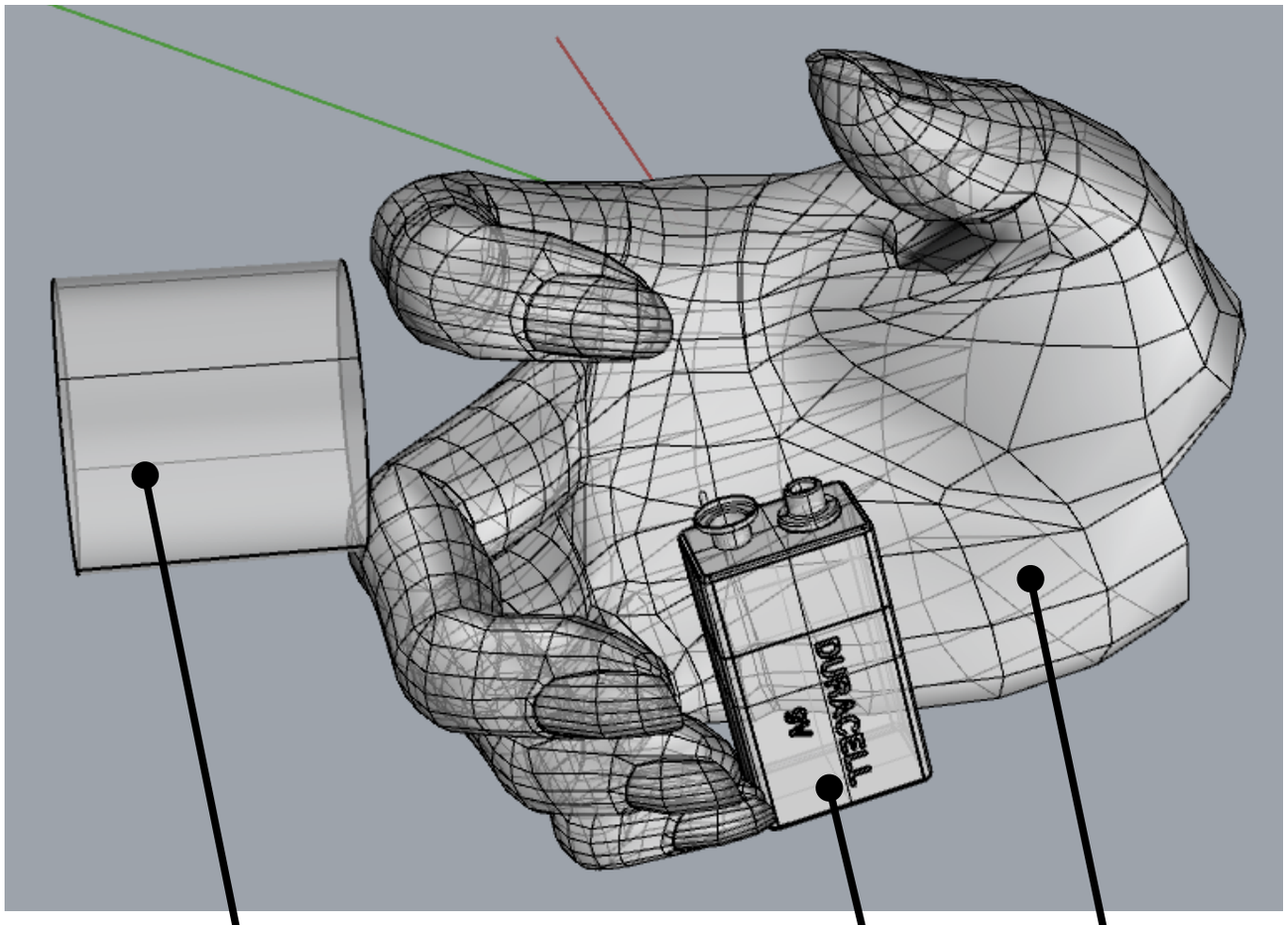
- Before drawing sketch, you can build simple geometry or lines in Rhino to indicate accurate size or inside component.
- In this case, a palm model, motor and battery are imported to help the designer shape the



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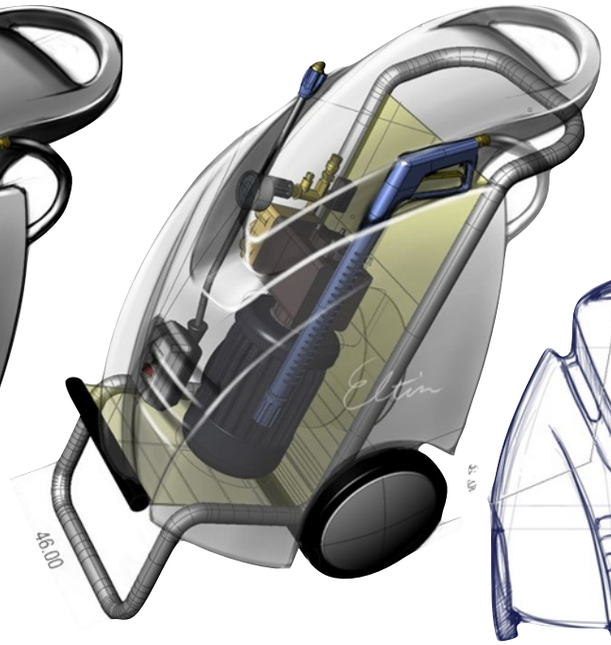
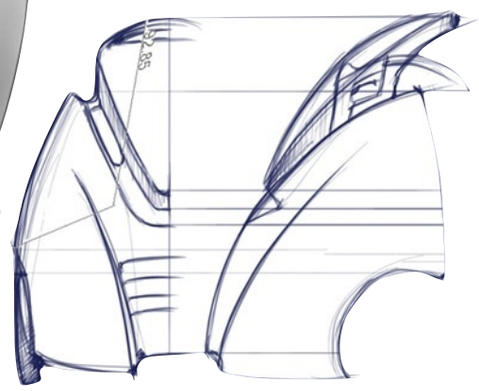
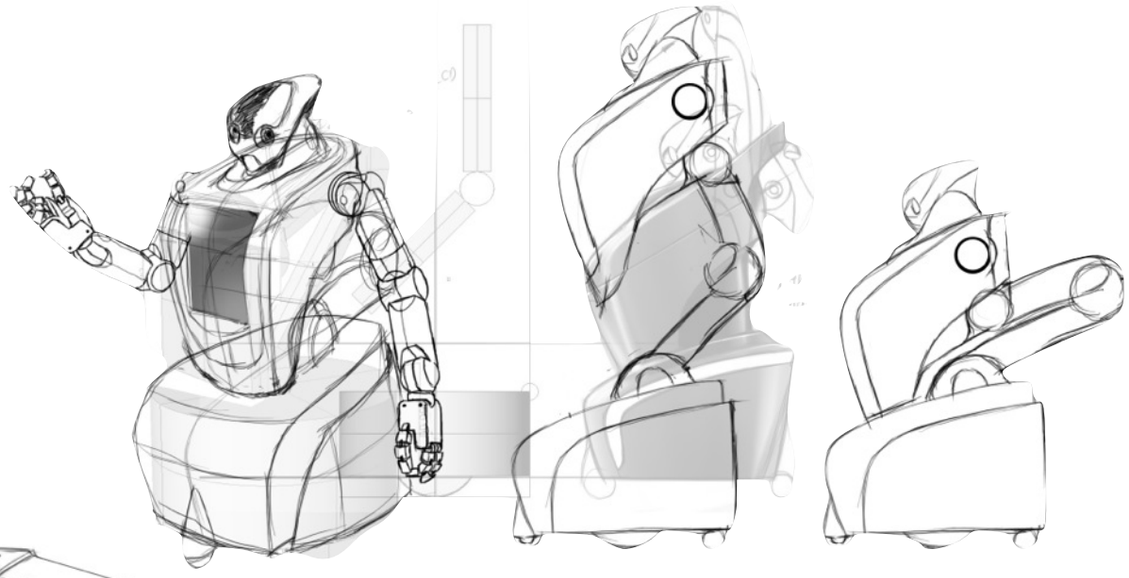
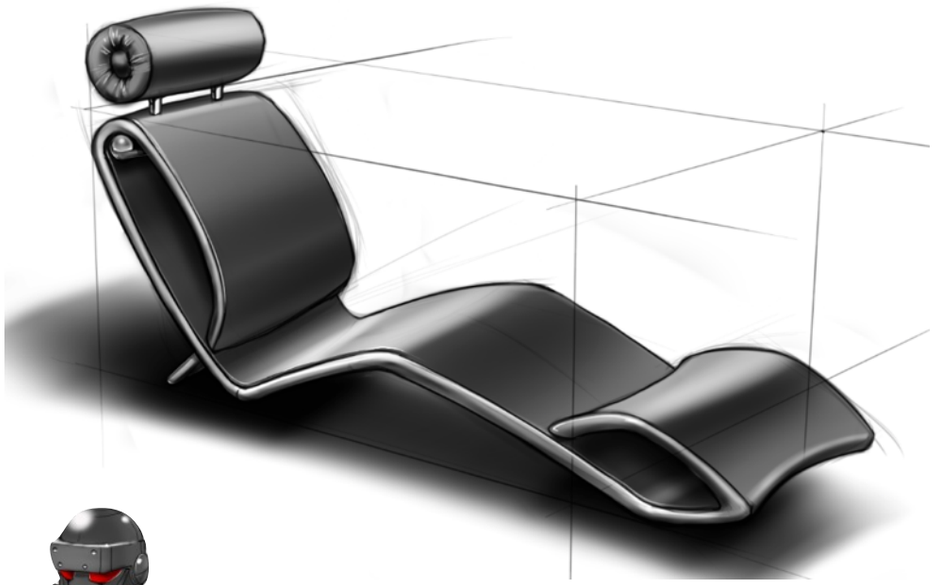
Palm model created in Proser

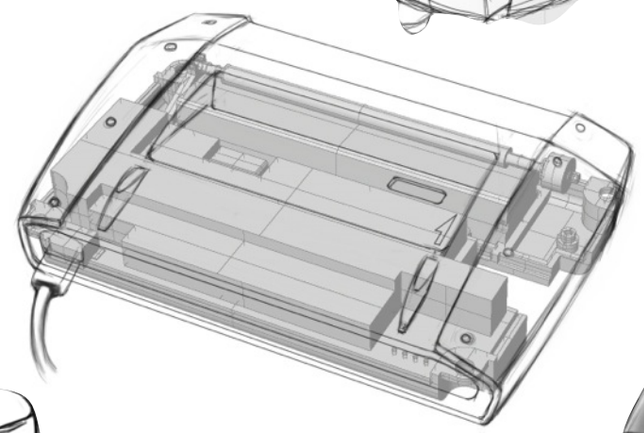
Other cases applied sketch on the inside framework, usually I got the inner models from my customers. Or simple lines or boxes can indicate size will do.

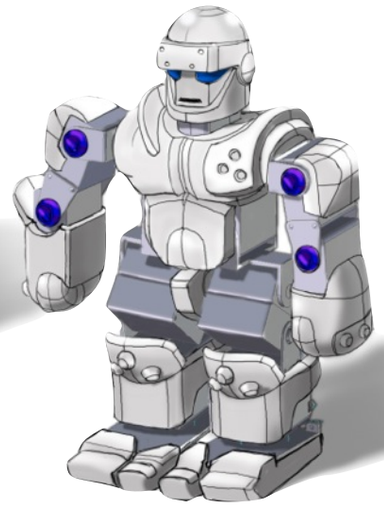


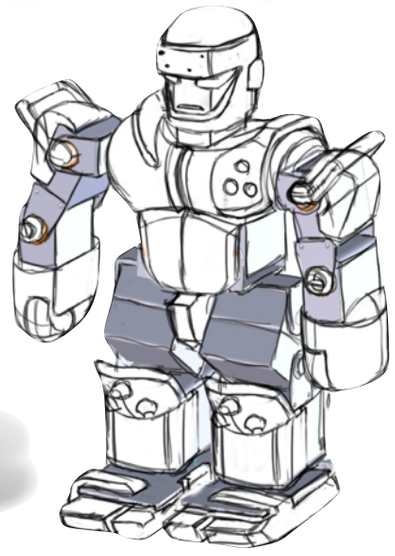


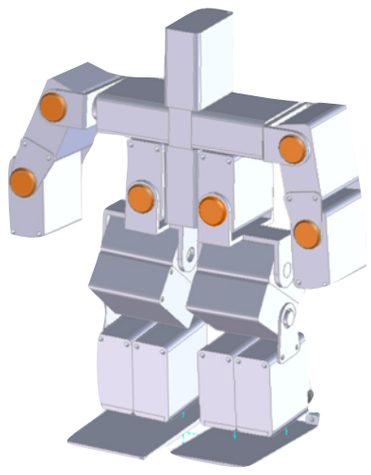






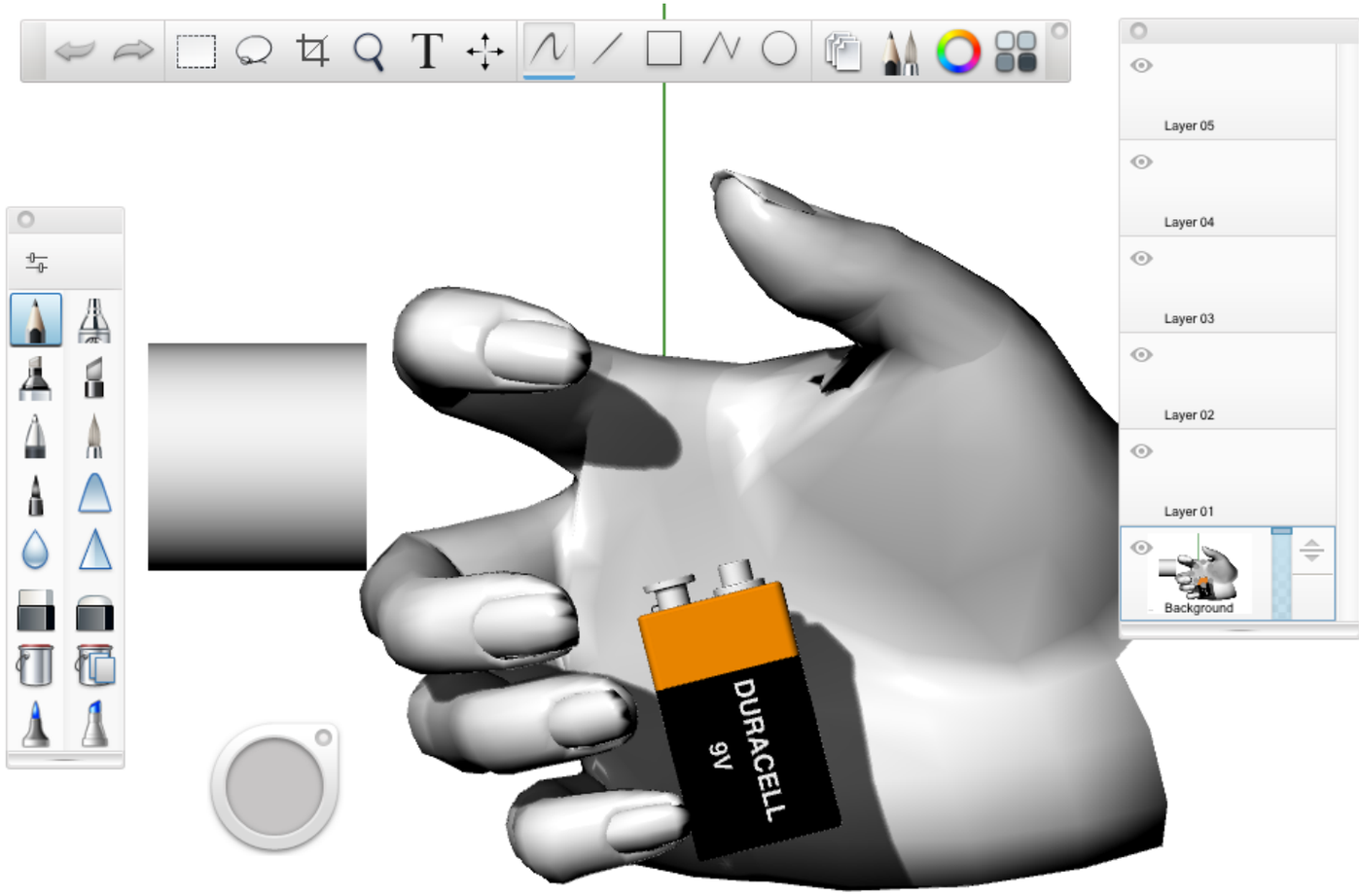






Export images for sketch drawing

- Take a full screen shot from the Rhino viewport.
- Open the screen shot in the Sketchbook Express.

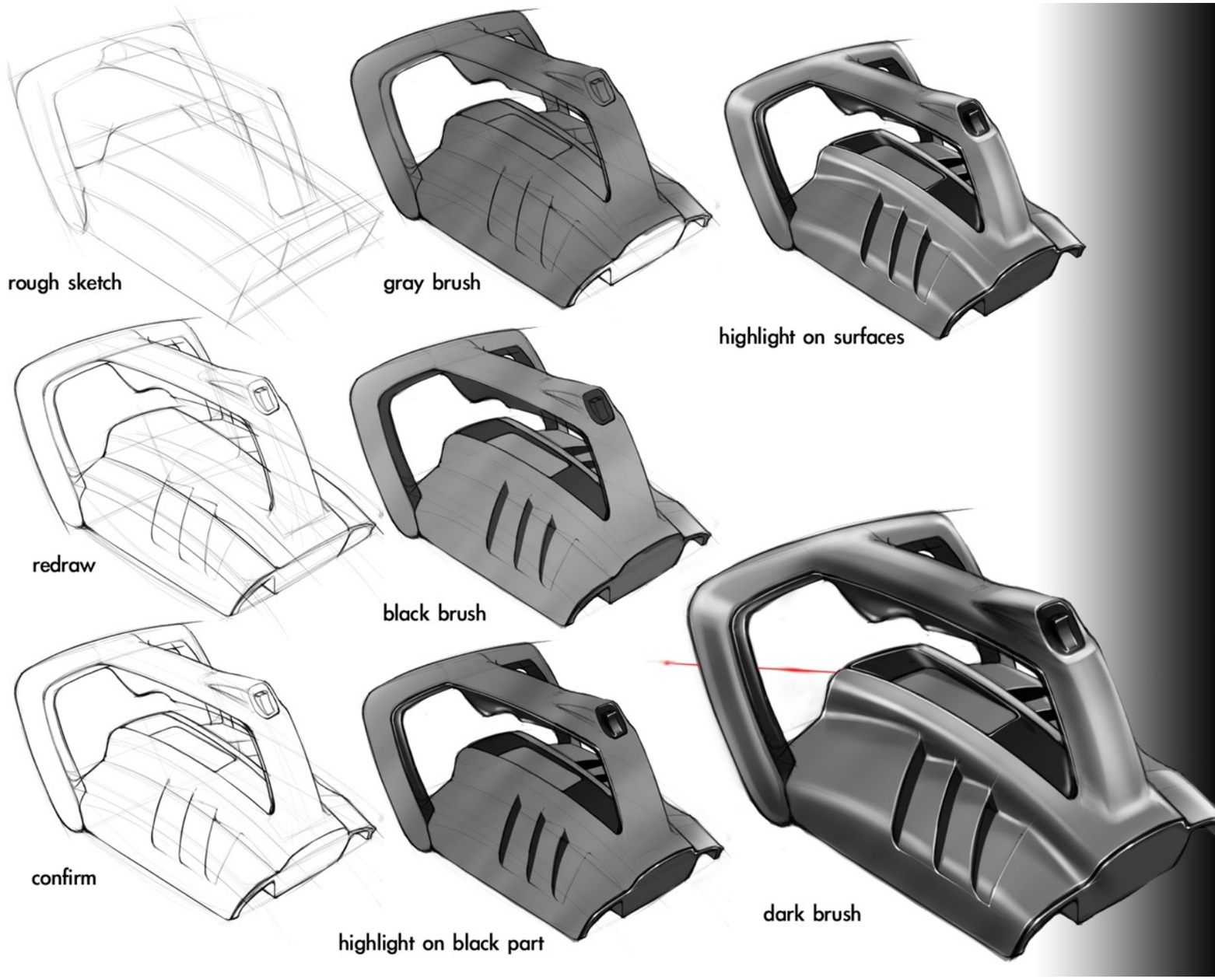


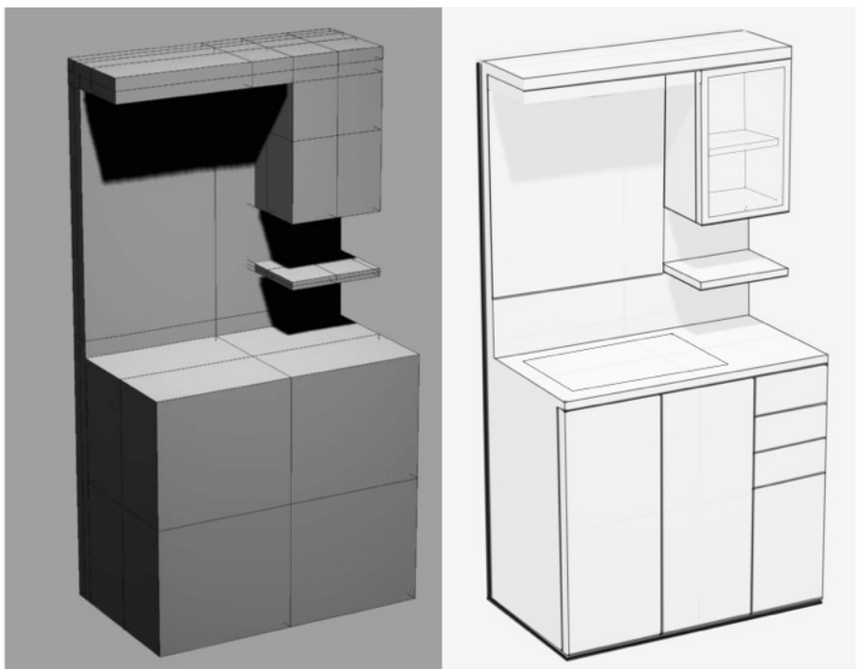
Draw sketch in the software

- You will need a Wacom tablet.
- Manage the layer function to help the drawing.
- Adjust the opacity of each layer when you need.
- Feel free to draw, you can undo and switch tools any time.

The advantage of digital sketch:

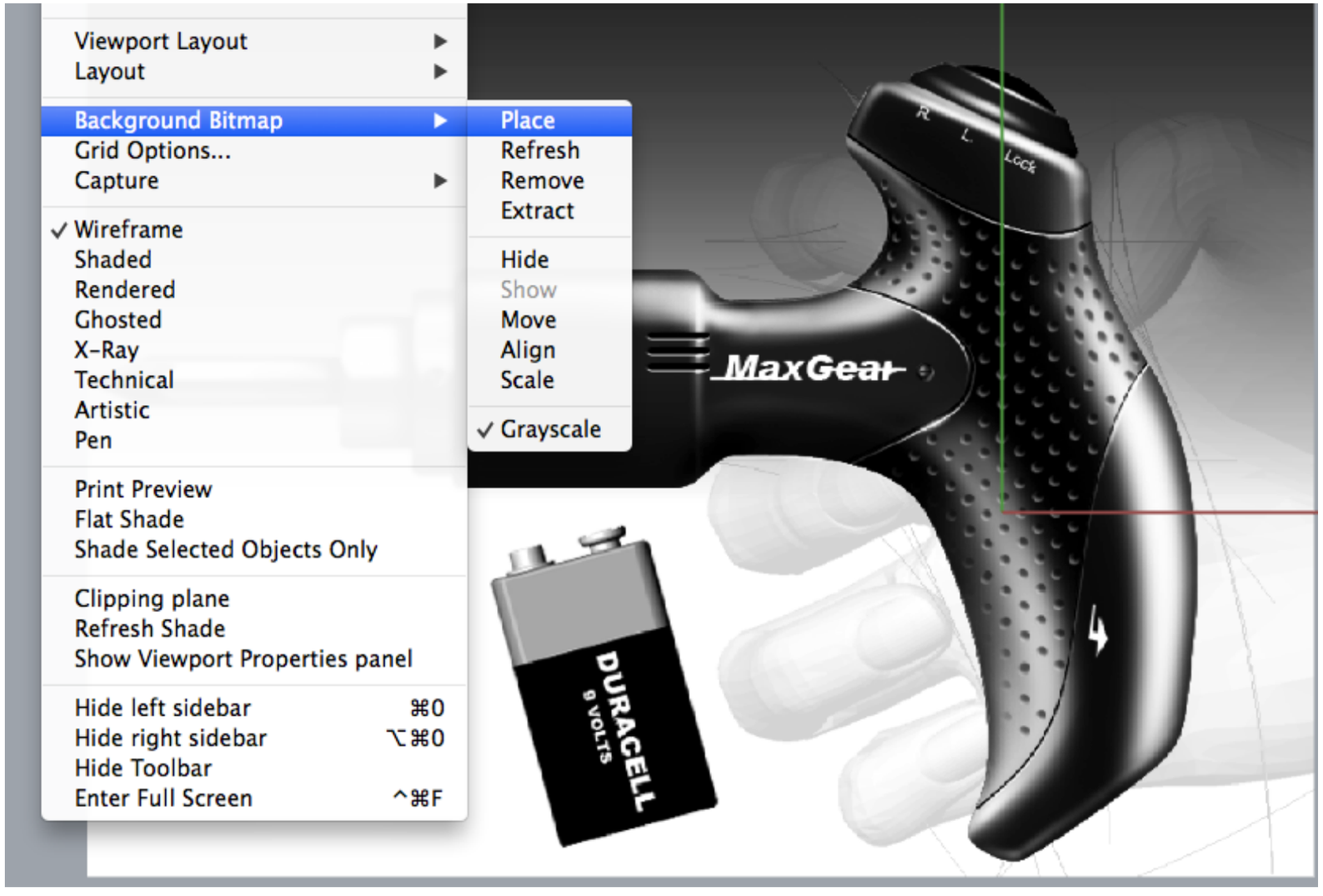
Import referring images.
Layer control and adjust.
Undo: 10-20 times undo.
Rapid brush tool: unlimited brush size.





Import sketch into Rhino

- Save your sketch as BMP or JPG file.
- Choose a viewport in Rhino and import sketch by the command: View/ Background Bitmap/Place.
- Caliber the sketch to fit the referring objects by Background Bitmap commands: Move, Scale.



Create and edit plane curves

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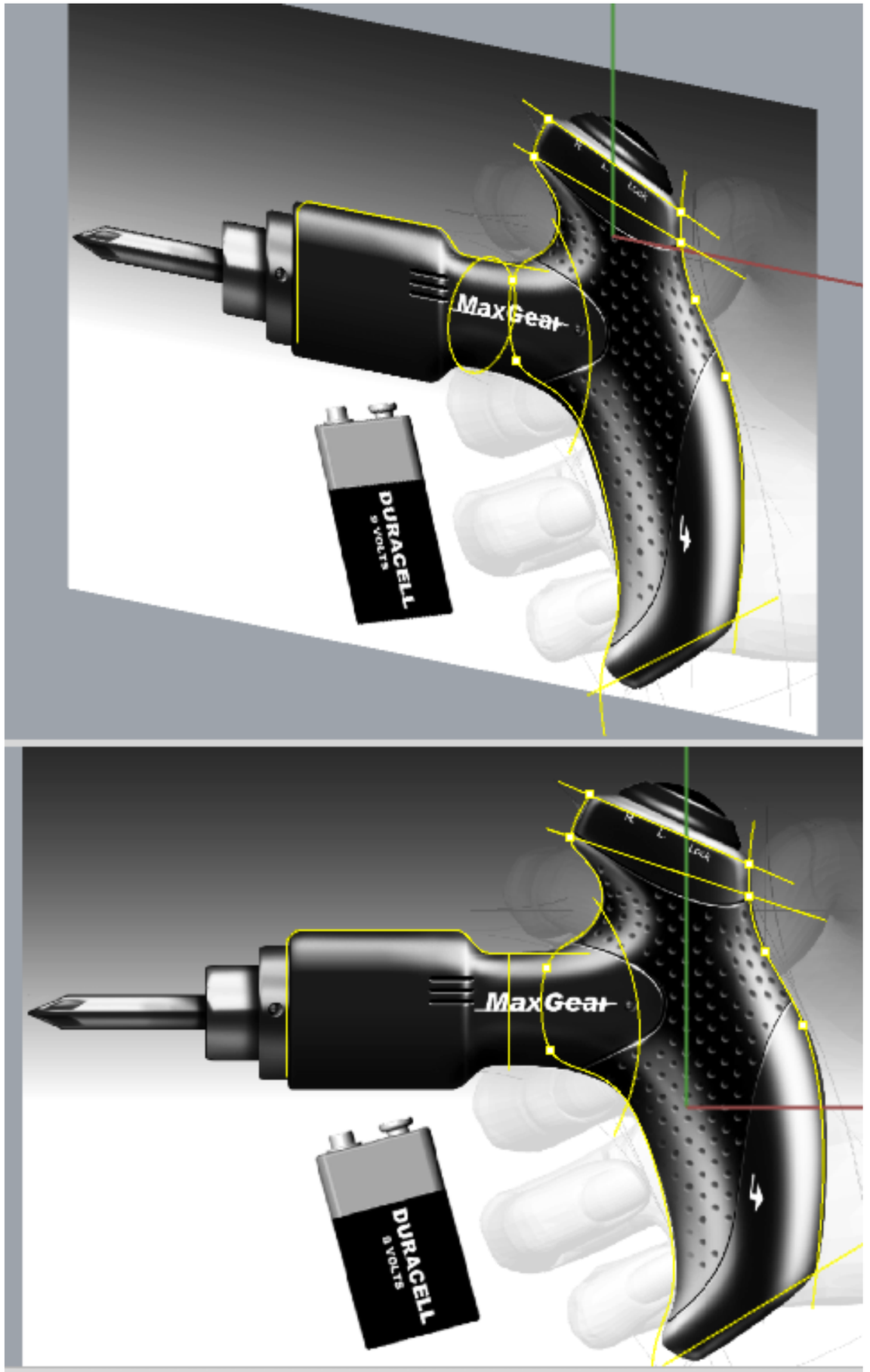
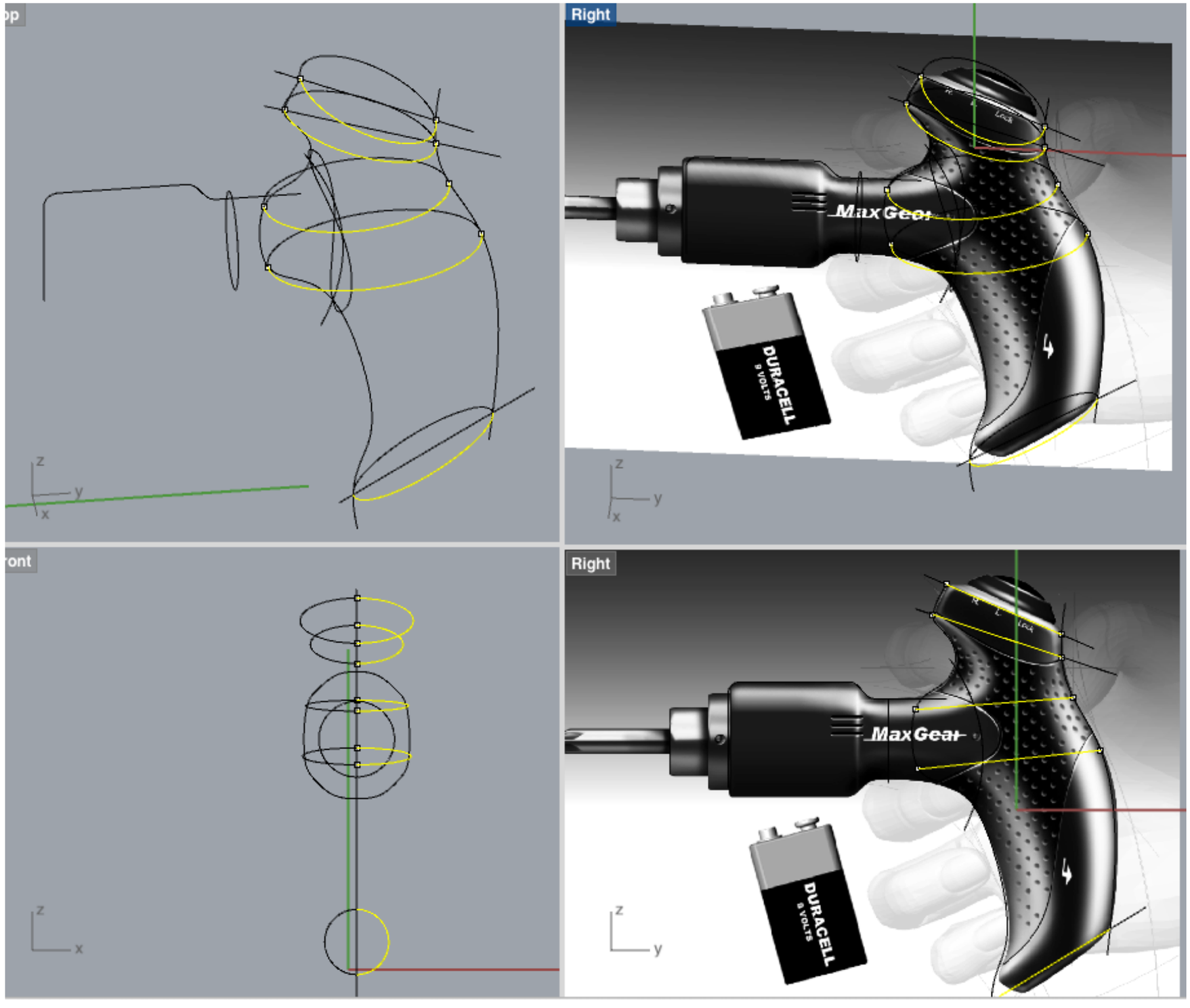
- Draw and edit the outlines to fit the sketch by Curve commands: Control point curve, trim, join and other edit commands.
- You can adjust curves by turn on curve points and fix the curve to match the sketch.
- You don’t have to draw curves carefully, because you can adjust them anyway.



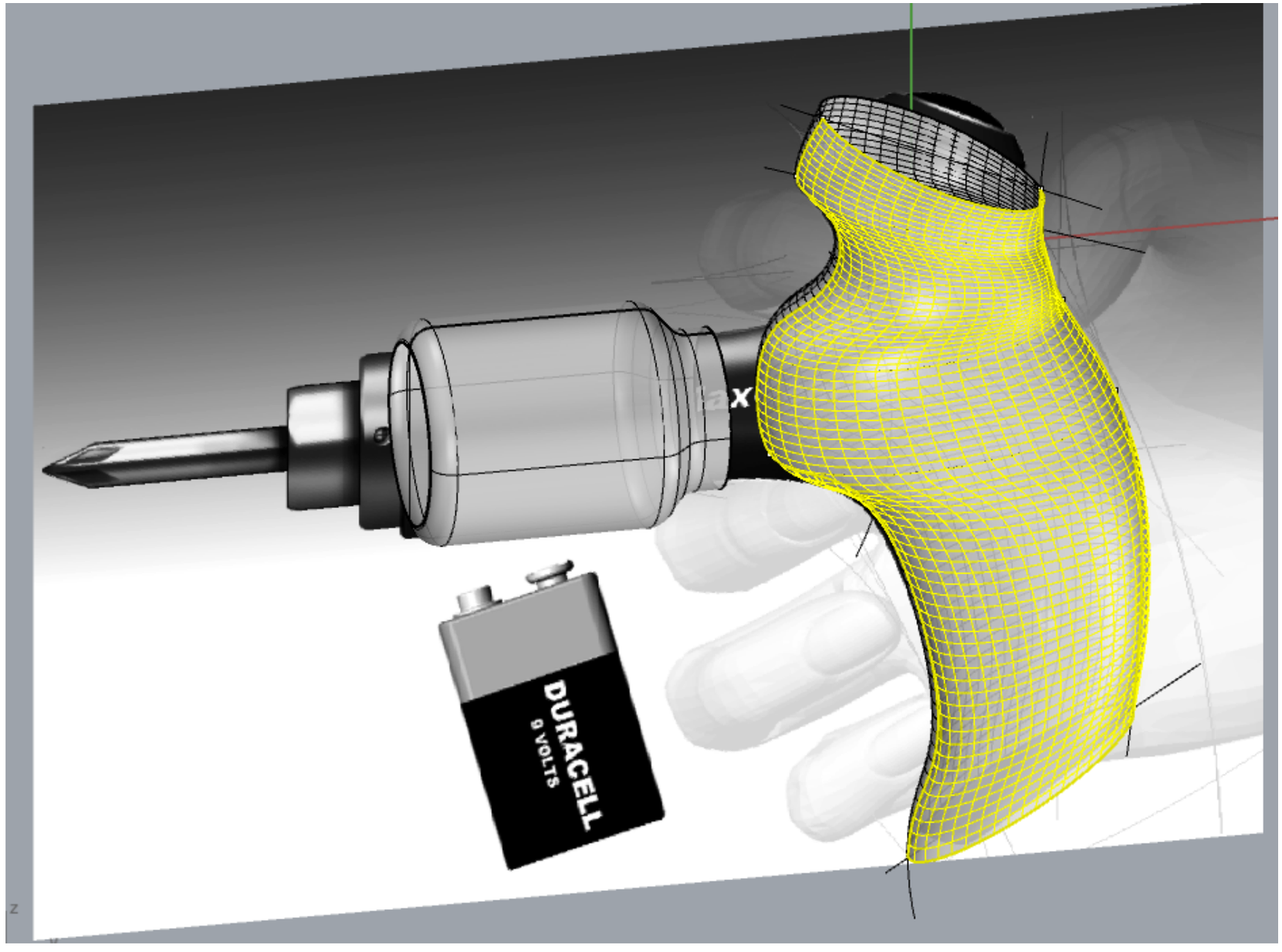
Draw 3D curves　6/9

- In this case, the 3D curves only means the cross-sections of the handle, so you can use the Ellipse to create the 3D curves.
- You will need applying project or intersection commands to generate other 3D curves in complex model.



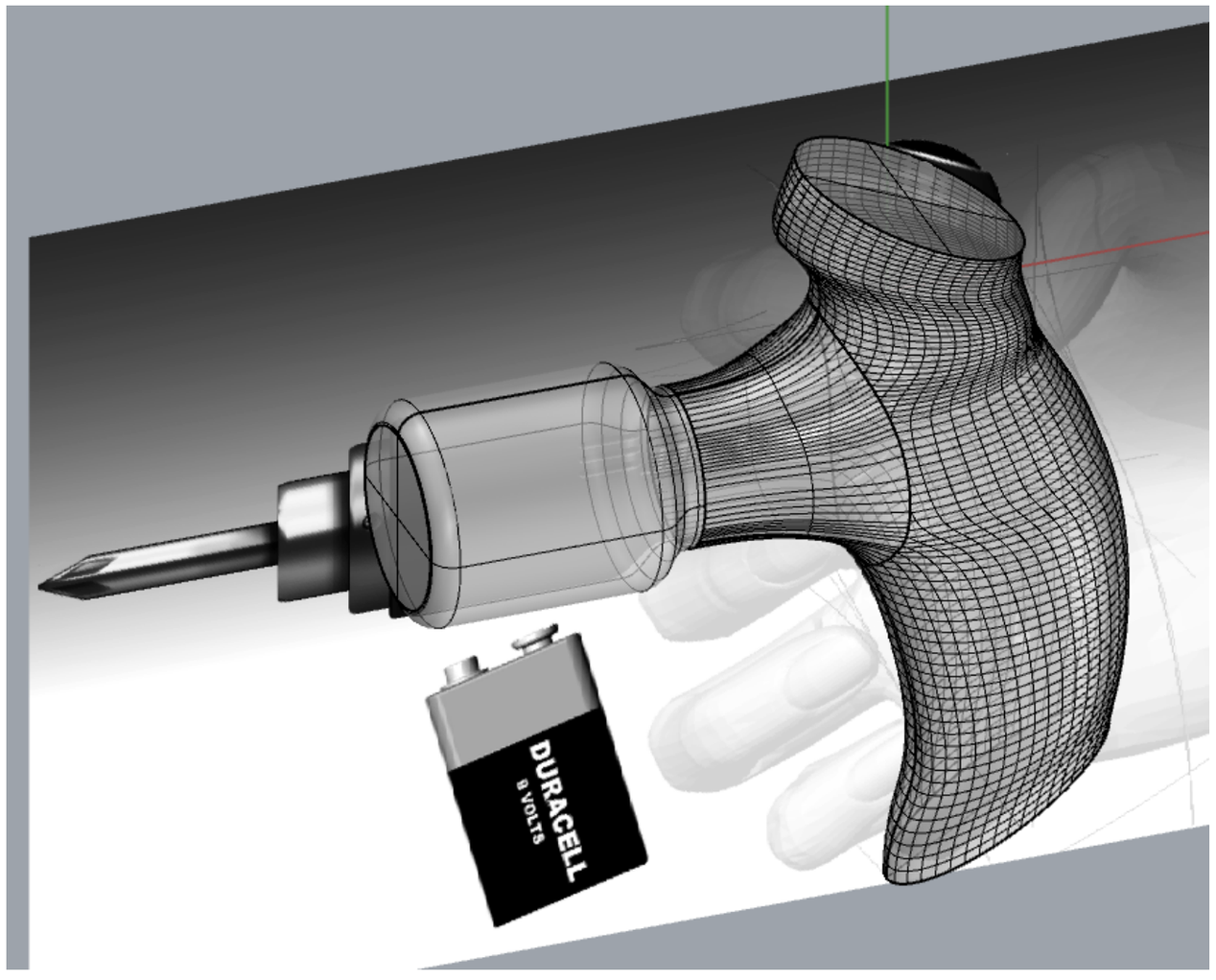
Create basic surface 7/9

- Use the curves and Sweep or Network commands to create the basic surface.
- It is impossible to create a complex form in one command.
- Usually you have to create main surfaces and then compose them.
- In this case, handle and motor are the main surface, so think about the modeling strategy to separate the form and create them.



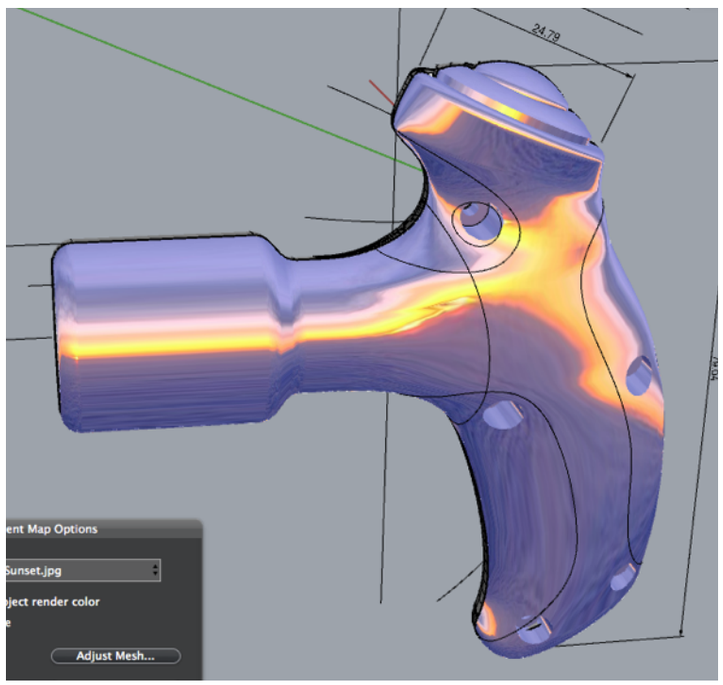
Create detailed surface

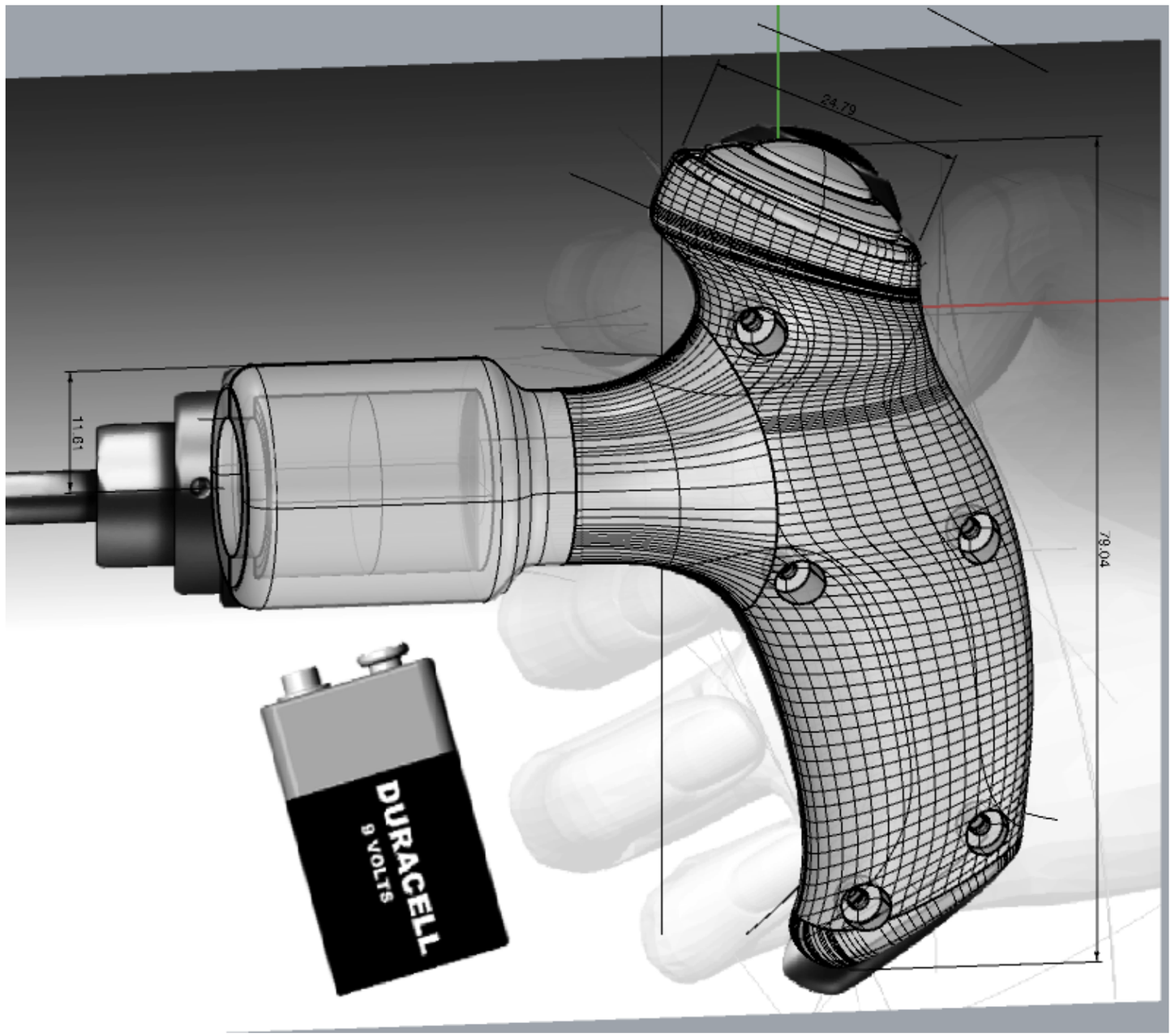
- In this case, the handle is cut and make a naked edge to create a surface and connect the motor.
- For most complex models, you have to repeat the process very frequently.
- Blend surface and other surface commands are very useful in making the secondary surfaces.

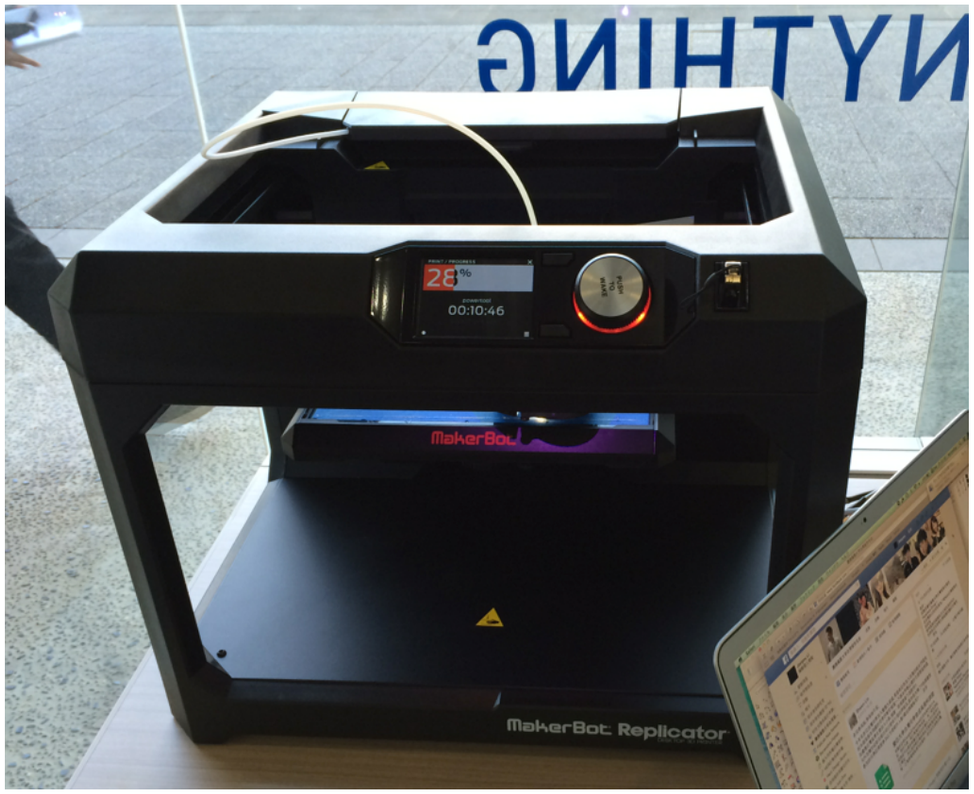


Re-sweep or rebuild surface 9/9

- Sometimes you will need to rebuild those surfaces again or in different order for better surface quality.
- Only very few original surfaces will remain in the final form.
- You will accumulate experience in such cases.







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