

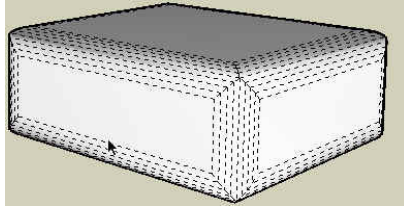
ROUNDING EDGES IN 3D

BzRoundEdge.rb

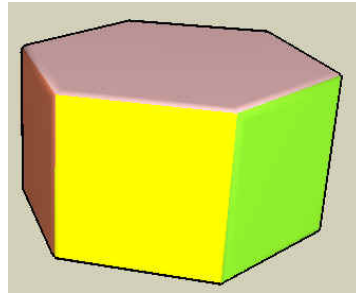
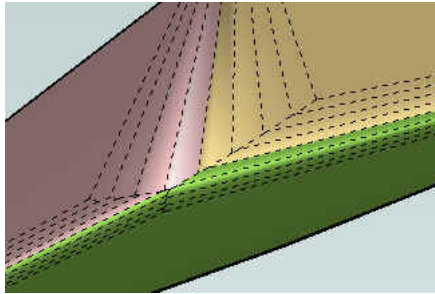
QUICKCARD – VERSION 1.0 – 10 JUN 08

1. Foreword

The present script tries to help in the frequent requests about chamfering or beveling edges. As I am not clear on what are exactly the differences between bevel and Chamfer, I simply called the script **RoundEdge**.



The script works on more complex shapes, when surfaces at edges are not perpendicular.



2. Installation

To install the script, you should unzip¹ the file you downloaded (*BzRoundEdge.zip* in principle) into the Sketchup Plugins folder. This operation should do the following:

- **Copy script files to the Sketchup Plugins folder:**
 - *BzRoundEdge.rb*, the main script for the Round Edge tool
 - *LibTraductor.rb*, to manage language translation².
- **Create a sub-folder RDE_DIR**, where are stored icons and cursor files (*RDE_...png*) as well as the documentation in PDF format.

The macro will insert one new menu item “*Round Edges*” in the menu 'Tools' in which you will find the variants of the tool, as submenus. It will also create a toolbar with the corresponding icons.

In the current version 1.0, there is only 1 tool published:



- **Rounding by Bezier**, based on Bezier curves (so not circles), which have the property to provide tangential rounding at edges in most topologies (again, credit to @last Software for the Bezier method).

¹ In Winzip, make sure you do a **Select All**, and then an extract in the Plugins folder, so that you create or properly update the subfolder RDE_DIR.

² This version (20 Jan 08) is also shared with *BezierSpline.rb*, *JointPushPull.rb* and *Tools On Surface*.

3. Using RoundEdge

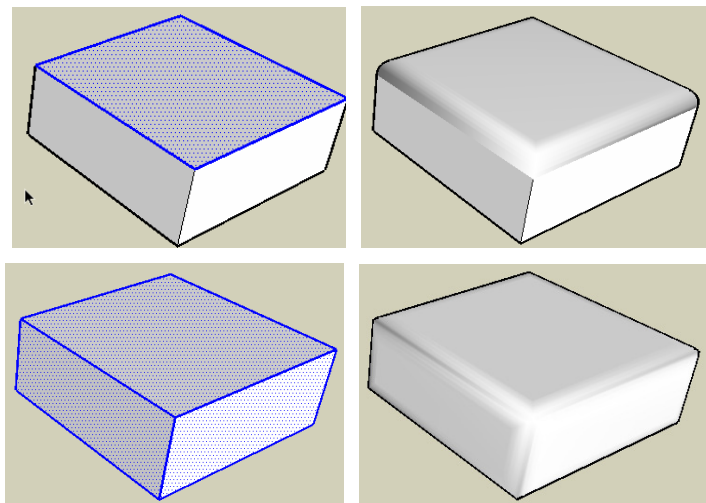
1) Selecting Edges

The tool works only on Edges that bordering exactly 2 faces, as otherwise, there is no way to orientate the rounding shape. In addition, I took the assumption that only edges that are not 'Soft', 'Hidden' or 'Soft' can be selected.

Like for many Sketchup tools, it supports 2 modes of selection: Explicit and Implicit

- **EXPLICIT:** Select first Edges and Faces in the model, then start the tool.

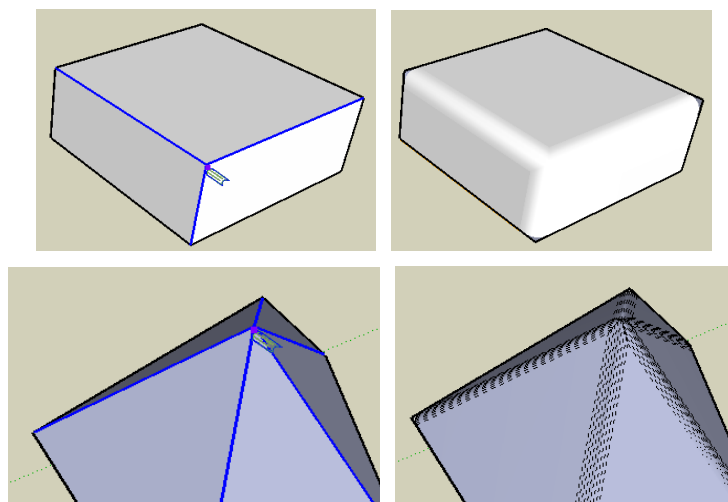
The tool will only retain valid Edges in the selection. And ignore other entities (face, construction lines, etc...). The Rounding operations starts right away when you click on the toolbar icon (or select the submenu).



- **IMPLICIT:** Start the tool with NO active selection, and select Edges by **Mouseover**, keeping **Shift** pressed (as in the Eraser Tool).

The Rounding operation starts immediately when you release the mouse button.

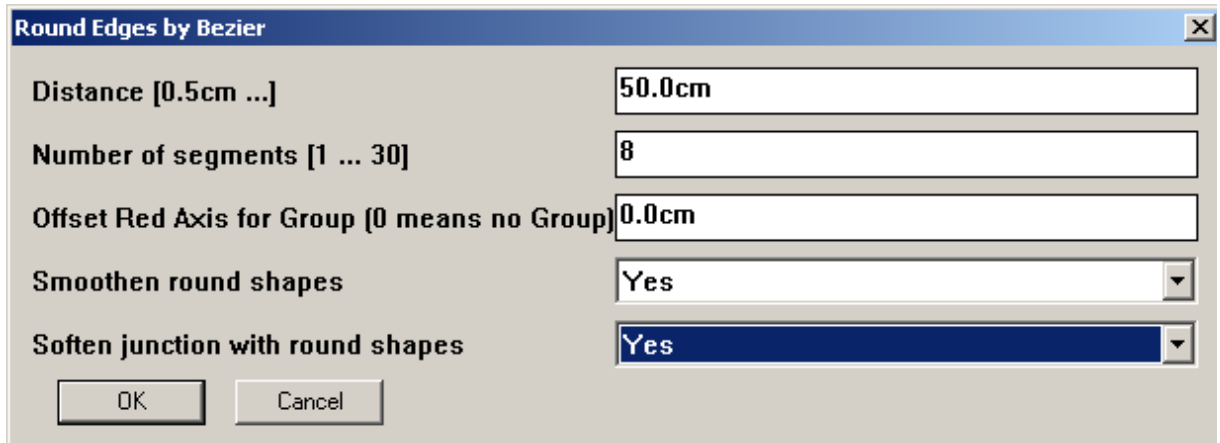
If you pass over a vertex, it will select all valid edges at this vertex.



Note: this mode is provisional, and I may update it later on, based on the feedback from users.

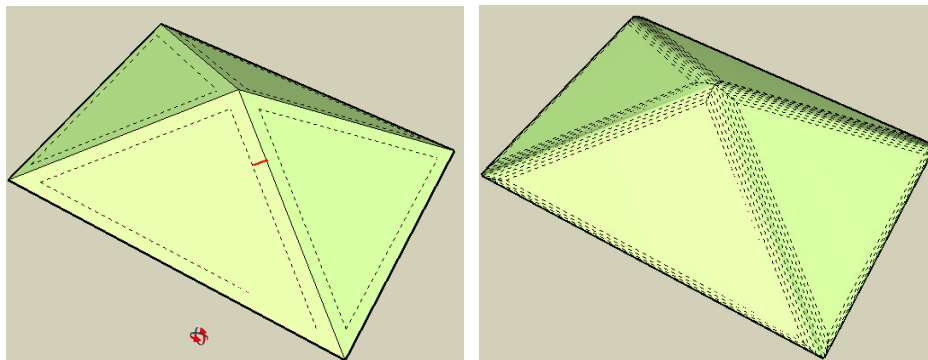
2) Parameters

When you have the Edge selection done, you are asked for the parameters of the operations via a dialog box:

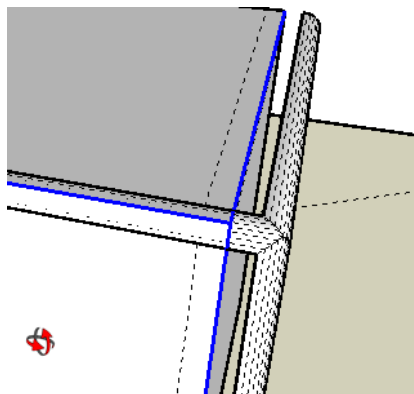


Note that all parameters are preserved within a Sketchup session.

- **Distance to Edge:** this is the with between the original edge and the connection on the faces after rounding, as shown in Red on the following picture:

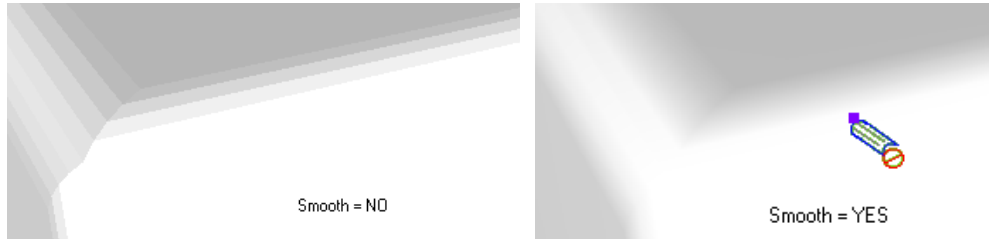


- **Number of segments:** this is simply the number of segments (or faces) used for the rounding shape. It can vary from 1 to 30.
- **Group Offset:** The script allows generating the rounding shapes in a Group, without impacting the original model. However, as the group would simply be hidden by the model, I propose here to enter the Offset following the Red axis which the Group will be moved (so that you can select it).

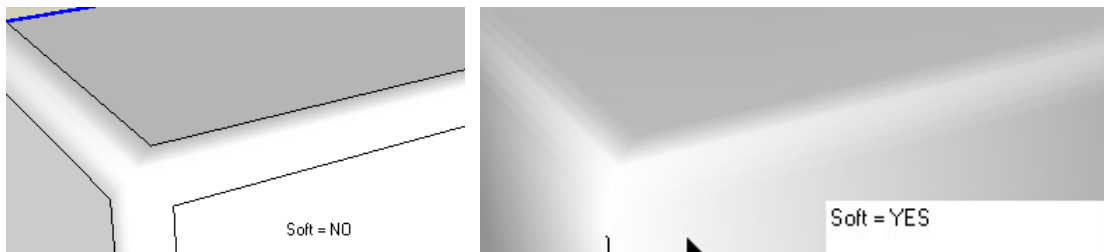


If the value of Group Offset is 0, then it means **NO Group generation**.

- **Smooth:** Specify whether you want to smoothen the edges in the rounding shape and at the junction with the model.



- **Soft:** Specify whether you want to Soften the edges at the junction between the rounding shape and the model. Note that Edges interior to the rounding shape are always softened.



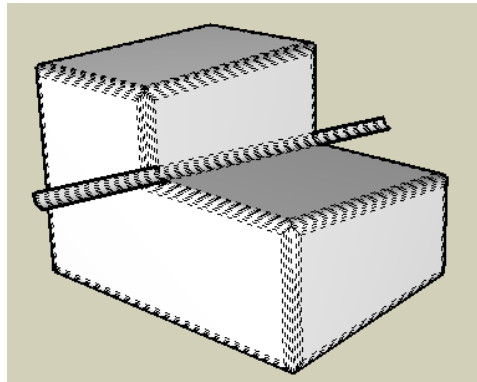
4. Known Problems

1) Performance

The macro is slow when you have a large number of edges, or many intersections with multiple edges joining. There is a Progress Bar to tell you where the script stands in the calculation and generation.

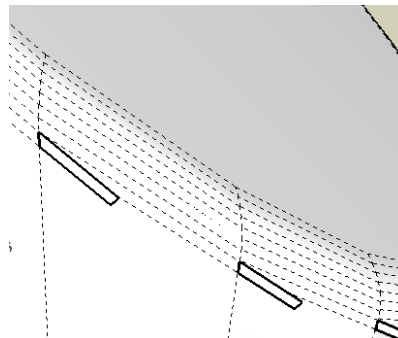
2) Adjacent Convex and Concave edges

The main issue happens when you mix adjacent 'Convex' and 'Concave' Edges. Note that these notions are purely relative from the human perspective, as geometrically, there is no difference. So you may get unexpected results in such cases. I will fix it in a next version.



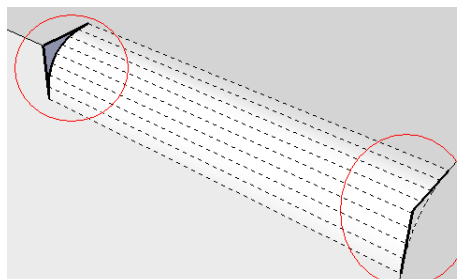
3) Sheared surfaces

For some sheared surfaces, the intersection is not perfect. I need to spend much more time on the geometry to see what can be done:



4) Terminal standalone edges

These are edges that just terminate at a vertex with no connection with others. Here too, I tried to provide a meaningful termination, but I did not manage yet to clean up the geometry at the termination (you can do it by hand easily however).



5. Future Evolutions

I think it is manageable with the same approach to use other classes of profiles for rounding, as long as geometrically meaningful. Circles can be used, but would not always provide tangency on bordering faces.

Actually, it is possible to consider a next version with custom profiles (basically, you would draw the profile somewhere in the model), and it will be scaled and oriented to be used for the rounding.

Just to give an idea, here is a quick trial I have made (with 2 Bezier curves)

