SUITE OF TOOLS ON SURFACE:

Offset, Lines, Polygons and Circle
Eraser and Contour Edition

QUICKCARD – VERSION 1.2

1. Installation

To install the scripts, you should unzip[1] the file you downloaded (*ToolsOnSurface.zip* in principle) into the Sketchup Plugins folder. This operation should do the following:

- **Copy script files to the Sketchup Plugins folder**:
  - ***ZLoader__OnSurface.rb***, the top script to load all others
  - ***OffsetOnSurface.rb***, the main script for the Offset operation
  - ***LineOnSurface.rb***, the script for drawing lines
  - ***PolygonOnSurface.rb***, the script for drawing polygons and circles
  - ***EraserOnSurface.rb***, the script for erasing contours
  - ***PolylineOnSurface.rb***, the script for edit contours
  - ***LibOnSurface.rb***, a common utility library for all tools on surface
  - ***LibTraductor.rb***, to manage language translation. Make sure you have the latest version (20 Jan 08), also shared with *BezierSpline.rb* and *JointPushPull.rb*.
  - ***LibTraductor.def*** a configuration file that can be edited to force a particular language
- **Create a sub-folder TOS_DIR**, where are stored icons and cursor files (***TOS_....png***) as well as the documentation in PDF format[2]. It also contains a file ***ToolsOnSurface.def***, which you may want to alter to change default settings.

The macro will insert one new menu item "***Tools On Surface***" in the menu ***'Tools'*** in which you will find the various tools on surface, as submenus. It will also create a toolbar with the corresponding icons.

In the current version 1.2, there are only 6 tools published:

- **Line on Surface**, to draw lines on surface
- **Polygon and Circles on Surface**, to draw polygon and circles on surface, defined by their radius or by their diameter.
- **Offset on Surface**, to offset a contour on a surface, inside or outside
- **Eraser on Surface** to safely erase portions of contours draw on surface
- **Contour Editor**, applicable to all contours drawn with the above tools

Note that each drawing tool has 2 modes, to generate geometry as **plain lines** or as **construction lines** (also called Guides, as of Sketchup 6).

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[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 TOS_DIR.

[2] You can remove the subfolder OFS_Dir which was used in previous versions

2. Common features to all Tools on Surface

1) Plain Lines versus Construction Lines

All tools support both modes of drawing. You can toggle between mode via the key **CTRL Alone** or **F2** at any time. In addition, you can put Construction points at all intersections of the created geometry (toggle **F3**). The current mode is indicated by the cursor shape, which is usually 'dashed' when drawing Construction lines.

2) Generation in a Group

For convenience (via toggle **F6**), all generated geometry can be put into an 'OFS Group' which is common to all Operations on Surface and persistent during the Sketchup session. This OFS Group is generated within the *active* model. If you work within a group or a component, the OFS Group will be generated at this level. If you work within another group or component, another Group will be used.

By convention, the OFS Groups are named with a pattern "OFS___". If you change this name to something different, it will force the scripts to generate a new OFS Group for the next contour drawn.

3) Redoing by double Click

All drawing tools support a Redo via Double-click, which can be performed on another selection. The option is also available via the contextual menu.

4) Modifying parameters AFTER operations

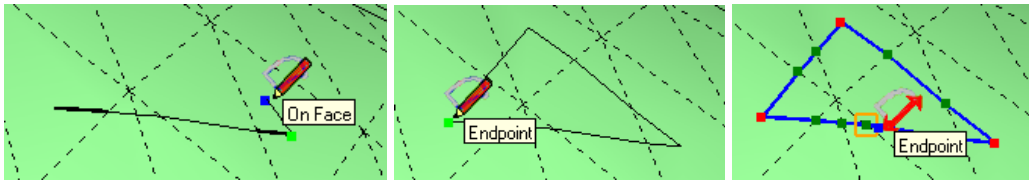
All tools support a change of parameters immediately AFTER the operation. For instance, once you offset a contour, you can type a new distance and get the contour adjusted. You need to avoid moving the cursor before entering the new value (or modifying the model via Undoing).

Note that due to limitations in the Sketchup Ruby API, the 'Modify After' for ***OffsetOnSurface*** can take some time if your active model contains many elements. For other tools, performance should be OK regardless of the complexity of your model.

5) Editing Contours on Surface

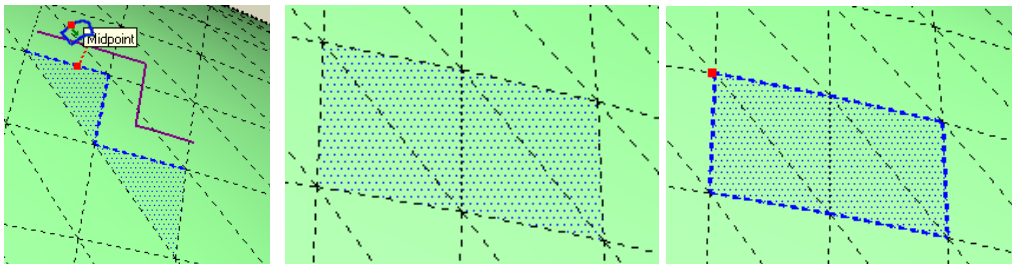
All contours generated by the Tools 'On Surface' can be later edited with two dedicated tools: **Eraser** and **Polyline Contour Editor**, which are described further in the present document. These tools will allow you moving, adding or erasing vertices in contours.

Note that a Contour is precisely defined by the sole fact that it has been generated by the Tools 'On Surface'. In principle, the Contour Editor will have the task to join lines drawn separately to reconstruct a full contour.

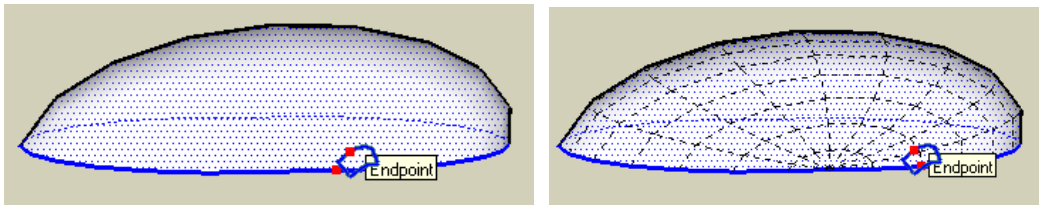


3. Offset On Surface

- **Selection of Edges and Faces**
  - **Explicit**: Select first Edges and Faces in the model, then start the tool.
    Edges must be such that they are either bordered by a single face, or if they are bordered by more, the inner face is also selected.

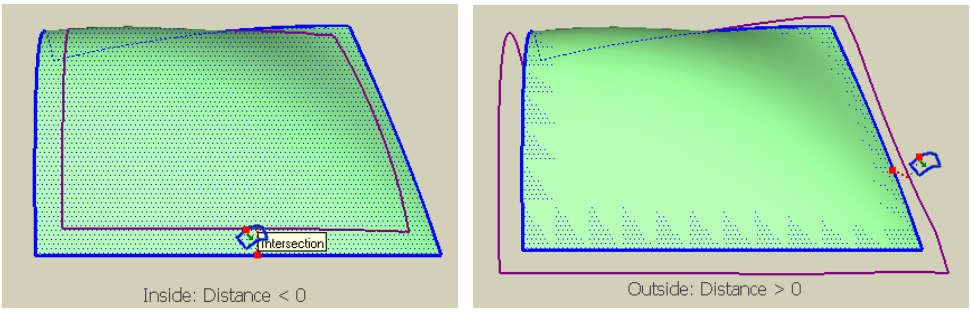


  - **Implicit**: Start the tool with NO active selection, and select surfaces by Mouseover (keep **Shift pressed** to select adjacent surfaces)



    Also, the **Toggle F5** key allows switching between selection modes: **Outer**, **Inner** or **All** contours, in case your surface has holes or embedded surfaces.

- **Entering Distance in VCB:** type number at any time, as a Length (in current model units) → ex: *"43"*. This will finish the Offset Operation.
  - **When Red Point (cross) not moved yet:** *Positive → Offset outside, Negative → Offset Inside*
  - **When Red Point (cross) already moved:** *Positive → same direction, Negative → Reverse direction*



- **Dragging Contour**: **Click, Drag, Release**, or **Click, Release, Drag, and Click again**, to offset the contour, while getting visual feedback.
- **Pressing Escape** will allow getting back in Implicit selection mode.
- **Repeating Offset with last distance**: when the Red point (or cross) are 'mobile', **Double Click** to do an offset with last entered distance.

- **Options**

  You can modify the options at any time during the Offset Operation. They are all mapped on **Toggle Function keys**, but are also available from the **contextual menu**. Status is indicated in the Sketchup status bar.

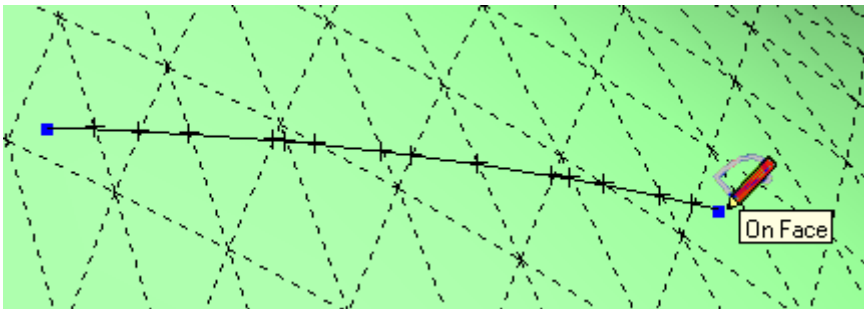
  Note: the options are preserved for the whole session.

  - **Plain Lines versus Construction Lines**: **F2** or **Ctrl Alone**
  - **Mark Vertices with Construction Points**: **F3**
  - **Simplify Generated Contour**: **F4**
  - **Select Contour type (Inner, Outer, both)**: **F5** – This only applies for implicit selection
  - **Generate as Group**: **F6**
  - **Treat surface as Standalone**: **F7**
  - **Generate Surfaces for Outside Offset**: **F8** (Plain Line only)
  - **Generate Contour as Curves**: **F9** (Plain Line only)

  Please refer to full manual for details.

4. Line On Surface

This tool tries to mimic the behavior of the native Sketchup Line tool, but on Surface. It will therefore create the segments and intersections when crossing face boundaries.



- **Behavior**
  - **Click** on Origin, then **Drag** to End point and **Release**. You can also Click, Release, Drag and then Click again.
  - You can **type a distance in the VCB** (in current units, positive or negative) which will pursuer the line up to that distance.
  - By default, lines are chained (Origin of next line is End of last line), so that you can easily draw polylines. Type **Escape** to start from a new Origin.
  - **Redo by Double Click** is interpreted as using the previous distance if you already dragged the End point, or to draw a line with the same orientation and distance if you start from a new origin, before clicking (this latter option can be useful to draw parallel lines at different points).
- **Options**

  You can modify the options at any time during the Drawing Operation. They are all mapped on **Toggle Function keys**, but are also available from the **contextual menu**. Status is indicated in the Sketchup status bar.

  Note: the options are preserved for the whole session.
  - **Plain Lines versus Construction Lines**: **F2** or **Ctrl Alone**
  - **Mark Vertices with Construction Points**: **F3**
  - **Generate as Group**: **F6**
  - **Generate Contour as Curves**: **F9** (Plain Line only)

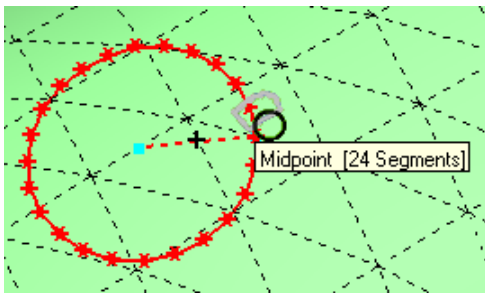
5. Polygon and Circle On Surface

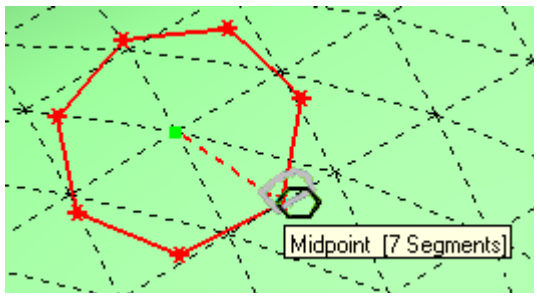
This tool tries to mimic the behavior of the native Sketchup Circle and Polygon tools, but on Surface. It will therefore create the segments and intersections when crossing face boundaries.

For convenience, there are 2 different tools (although it is the exact same tool), each with its own persistent parameters:

- **Circle** (default number of segments is 24)
- **Polygon** (default number of segments is 6)

Polygons can have 3 to 150 segments, so from triangle to very high-poly circle!





- **Behavior**
  - **Click** on Origin, then **Drag** to End point and **Release**. You can also Click, Release, Drag and then Click again. The origin is normally the center of the polygon, when defined by radius, or one vertex of the polygon, when defined by diameter. The end point is one vertex of the polygon or circle.
  - **In the VCB**, you can specify both the length of the Radius (or diameter), and the number of segments:
    - Radius / Diameter length as a normal number (in current units)
    - Number of segments as a number followed by a **'s'**.

    You can enter both concurrently, by separating them with a **semi-column** (';').
  - Type **Escape** to reset the tool from a new Origin, when you have started dragging.
  - **Redo by Double Click** is interpreted as redoing the previous shape with the previous radius (or diameter) if you already dragged the End point, or to draw the exact same shape elsewhere if you just start from a new origin.
- **Options**

  You can modify the options at any time during the Drawing Operation. They are all mapped on **Toggle Function keys**, but are also available from the **contextual menu**. Status is indicated in the Sketchup status bar.

  Note: the options are preserved for the whole session.
  - **Plain Lines versus Construction Lines**: **F2** or **Ctrl Alone**
  - **Mark Vertices with Construction Points**: **F3**
  - **By Radius or Diameter**: **F5**
  - **Generate as Group**: **F6**

- **Generate Contour as Curves**: **F9** (Plain Line only)

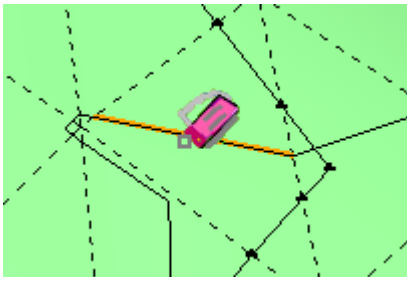
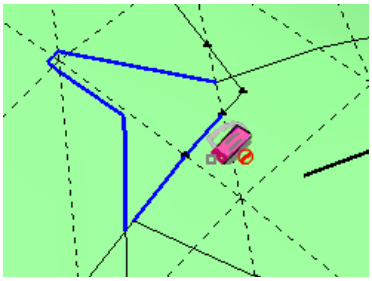
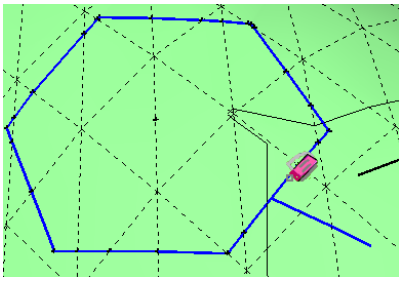
6. Eraser On Surface

This tool is more or less the replica of the standard Sketchup Eraser, but dedicated to Contours on Surface. As such, it only deals with these contours 'on surface' and will superbly ignore any other type of lines.

The tool supports separately plain lines and construction lines / points. Press **Ctrl alone** or **F2** to switch between the two modes.

After starting the Tool,

- **Mouse over contours**; edges which can be deleted are normally highlighted in orange.
- **Click and keep the button depressed** to select edges to be deleted.
- **When you release the mouse button**, the edges will be erased
- **Press Escape to ignore all edges already selected**
- If you keep **Shift depressed**, when selecting edges, you will actually select all other edges connected and forming a valid contour on surface. This option allows you deleting full contours in one click.

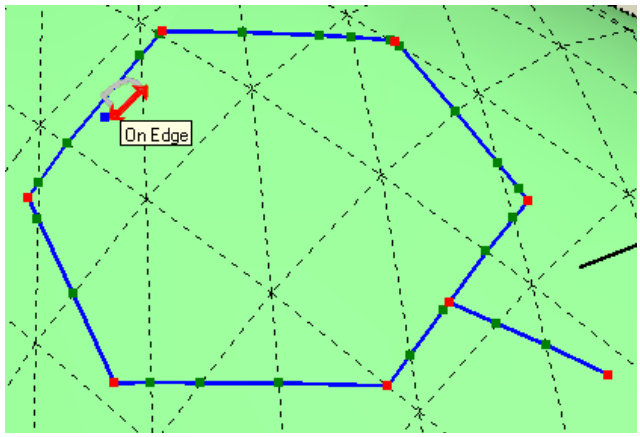
- **Options**

  No option, apart from toggle **F2** (or **Ctrl Alone**) between Line mode and Construction Line mode.

7. Contour Edition on Surface

As drawing accurate shapes on curved surfaces can sometimes be shaky, I found useful to provide a tool to edit the contours on surface. There is no equivalent native tool in Sketchup, so here's how it works:

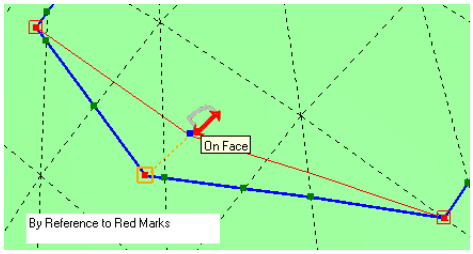
1) **Start the tool and move the mouse over the model** (no click or mouse button depressed). The tool will highlight contours as you pass over.



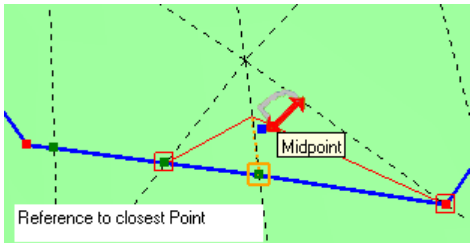
2) **Move a vertex**: **Click and drag** the vertex to its new position.

   You will notice that the marks on the contours are **Green** and **Red**. The Red ones are called *Anchors* and usually correspond to the meaningful points of the contour (start and end points for lines, vertices for polygons and circles). The Contour editor allows you to move a vertex by reference to either the closest anchors or just the next points on each side. The convention is the following:

   - **If you move a Red vertex**, the reference is the two closest Red Vertices



   - **If you move a Green vertex**, it will be by reference to the next points, whether Green or Red

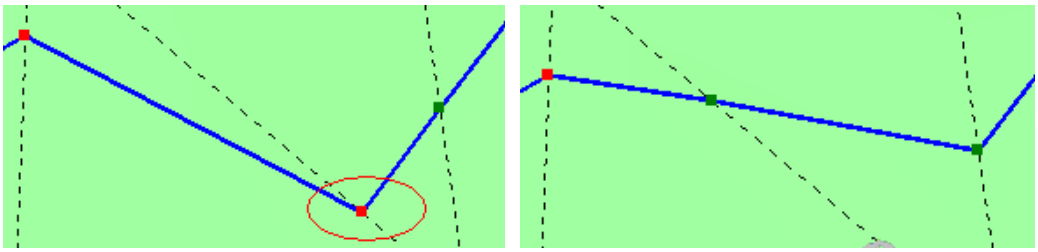


   You can reverse this behavior by keeping **Shift Depressed** while dragging the edited vertex.

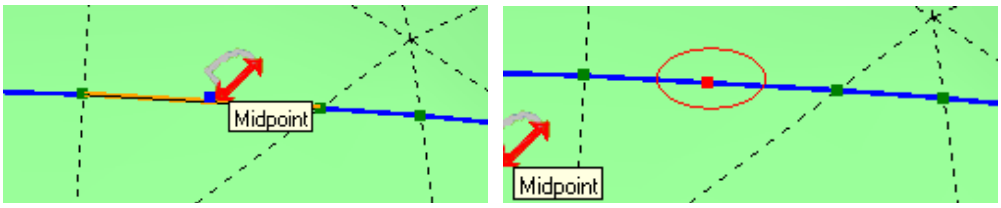
   In addition, you can **toggle the color of a mark** by clicking on it and keep the mouse down for at least 0.3 second (and then release).

   Finally, note that when a vertex is moved, it becomes automatically Red, as the script assume that you want to give it a pivot position.

3) **Delete a vertex**: **Double-Click on the vertex**. This will remove it from the contour references. Note however that new vertices can be created as a result of this operation.



4) **Add a vertex on an edge**: **Double-Click on the edge** where you wish to add a new vertex, which you will then be able to move later on.



The script will create the intersection points when vertex are moved or erased.

Caveats:

- For segments of the contour that are collinear to pre-existing edges of the surface, the script tries to reestablish their initial properties (i.e. soft, smooth). This may not always work in some situations.
- Contours generated by Offset On Surface may have very few Red points, as the vertices of the original contour may have been 'simplified'.