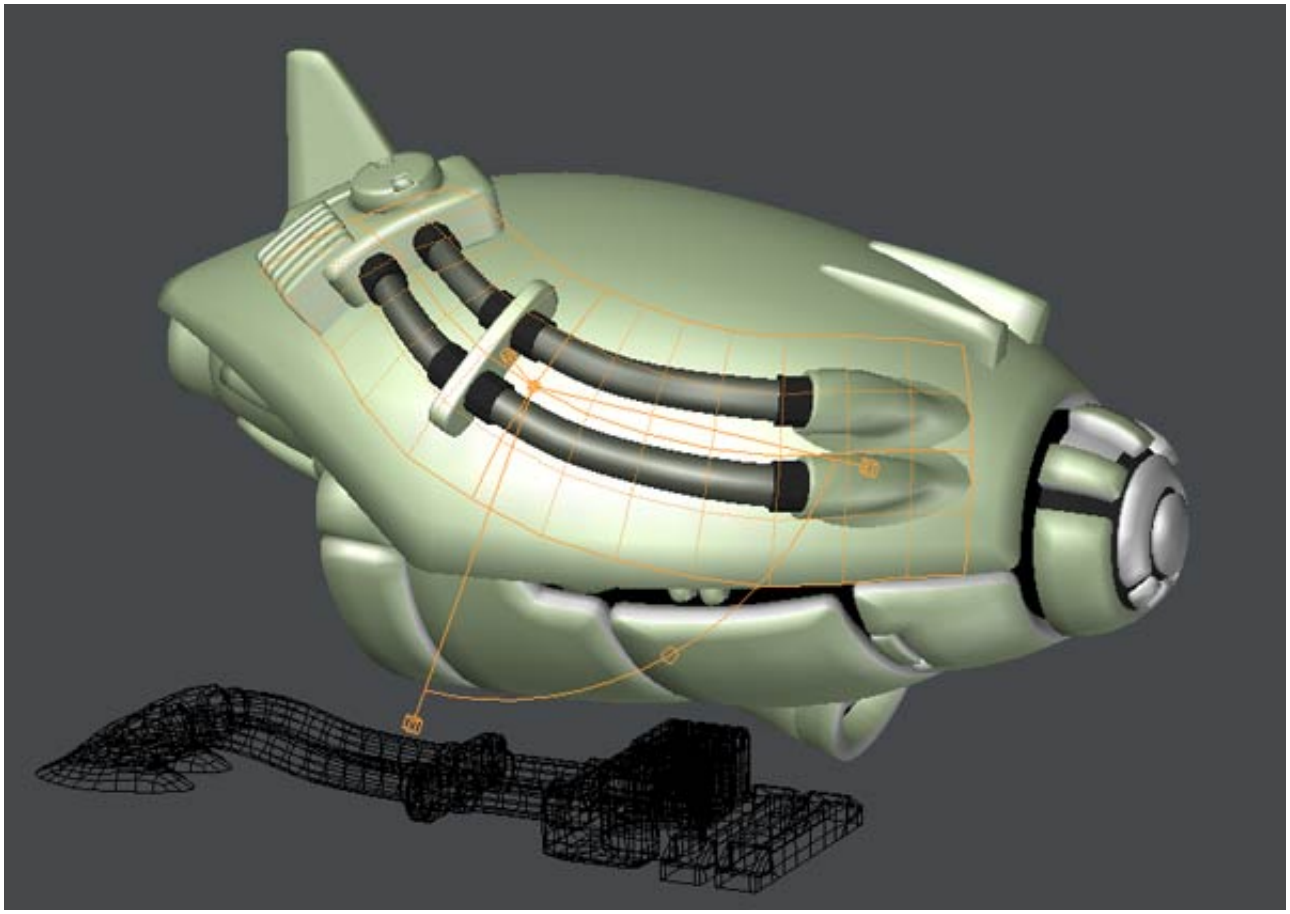
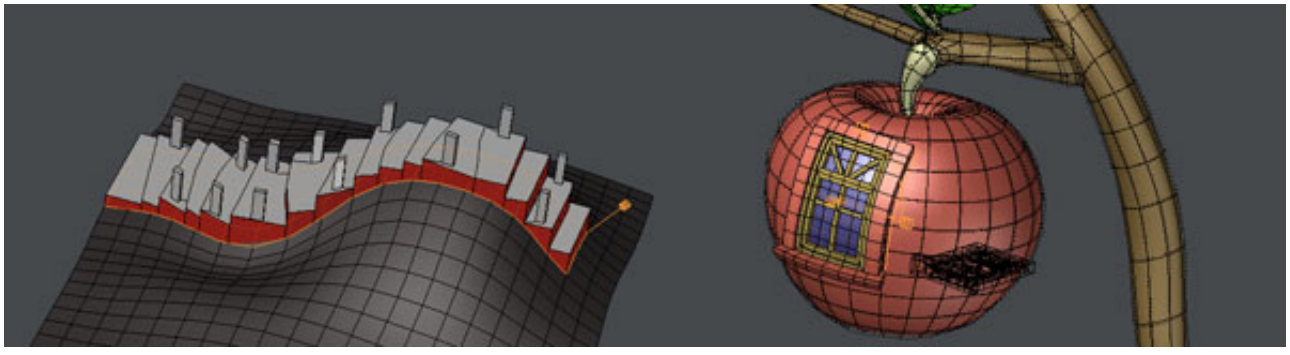
What is 3D Sticker

3D Sticker is a modeling tool for LightWave Modeler, which allows you to put the whole or separate parts of an object on the surface of another object. By clicking and dragging on the surface of objects in the foreground layers after activating the tool, the parts of objects placed on a XZ ground plane in the background layers will be duplicated, and they can be interactively placed on and deformed along the surface of the foreground object, just like putting a three-dimensional sticker on something in real world. Imagine that a 3D solid sticker is put on the rounded top of your mouse. This action is very simple, but powerful, which effectively and extensively help you model an object that consists of a lot of parts. For example, in putting a complex shaped belt on a character model, building a spaceship that has lots of parts on its surface, making grooved tires, attaching 3D ornaments to a vase, placing bricks and windows on the outer wall of a house and covering it with ivy plants, and things like those, this tool should play an active role in various scenes where you rapidly add great details to your model.

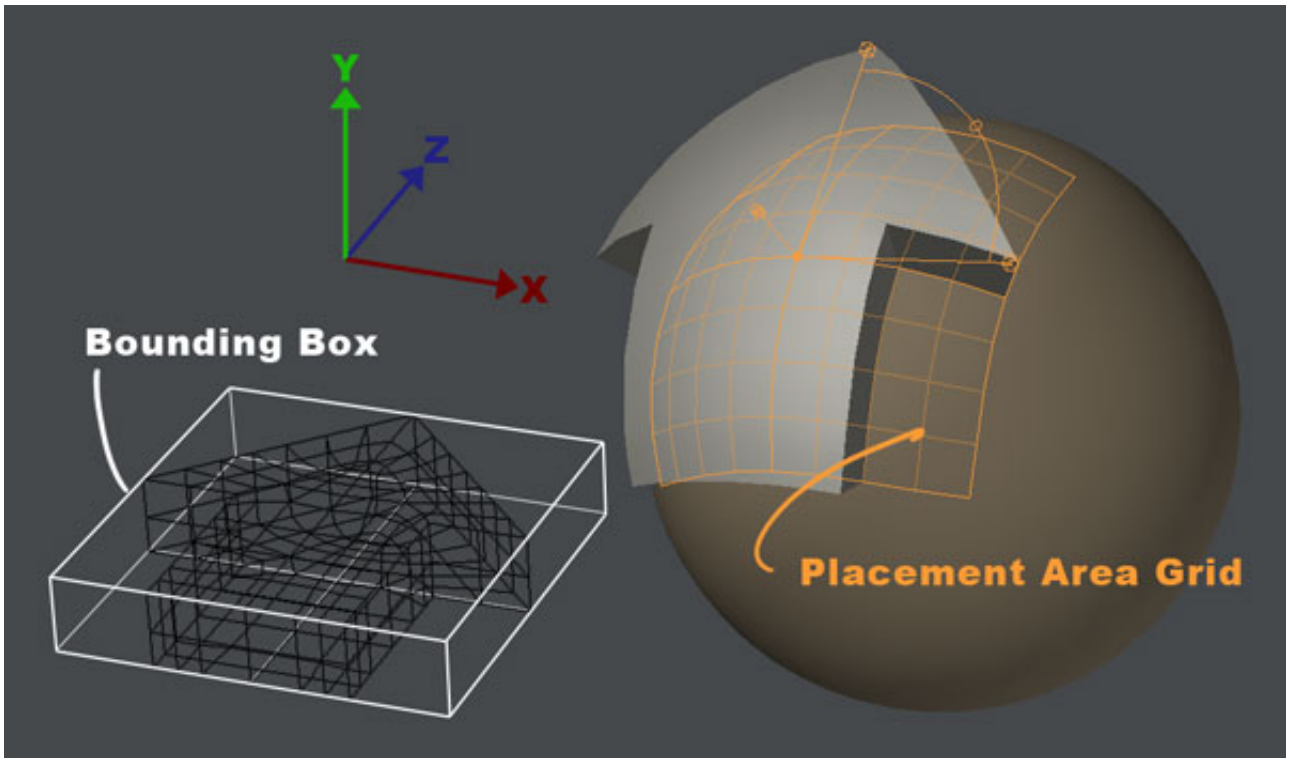




How to use 3D Sticker

First, place a base object in the foreground and parts objects, which are going to be placed on the base object, in the background, and then select the 3D Sticker tool. If you need to adjust the settings for the tool, pressing the default keyboard shortcut **N** key can open the numeric panel.

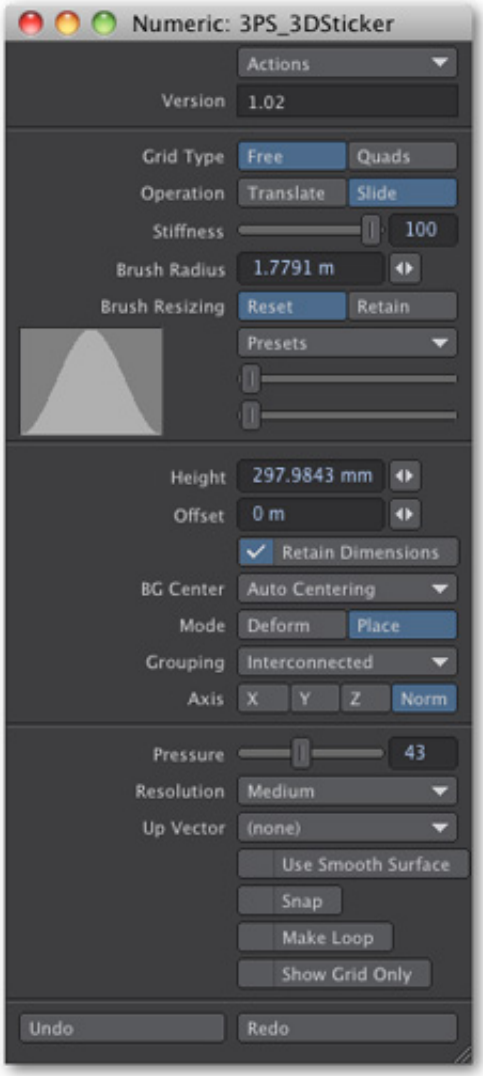
The first clicking on the surface of the foreground object will make the tool active, and it will start working. A duplicate copy of the background object is placed on a placement area grid spread along the surface of the foreground object. Its ground plane is determined by the bottom of the minimum bounding box enclosing the background objects. This grid can always be moved, rotated, scaled and additionally deformed until it is discarded, and almost all of the changes can be undone and redone. When you get the results you expect, you can accept them and exit the tool by tapping the spacebar.



Modeling requirements for better results

The surface of an object, on which you want to put something like a sticker, should be as smooth as possible. In real world, a sticker cannot be put on a very bumpy surface with no folds. If you try to put a sticker on the tip of something spike-shaped, it will get crumpled due to high curvature. It is clearly impossible to do so without crumpling the sticker. Similarly, if you do so with the 3D Sticker tool, it will produce undesirable results.

Controls

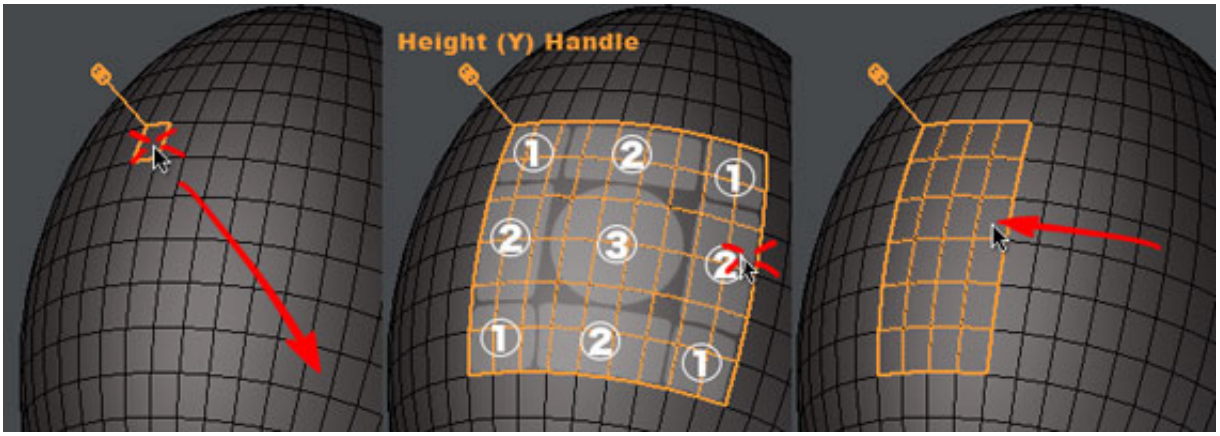


Grid Type - has two types of placement area grids. Below are the options available:

Free - The placement area grid will be spread centering around the position of first-clicking along the surface of the base object, which can be flexibly slid, rotated, scaled, and additionally deformed by clicking and dragging, if necessary. This option allows you to place parts objects independently of polygon flow of the base object. When this is chosen, the **Operation** option and some options relating to **Brush** become available.

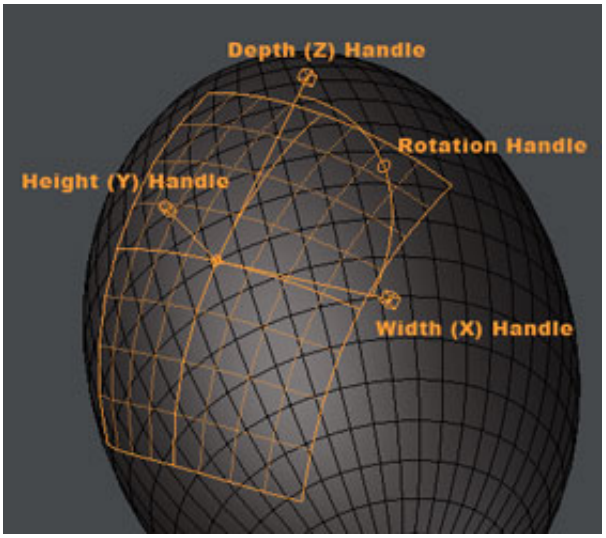
Quads - While you first click and drag on the surface of the base object, the placement area grid will be interactively formed from the first-clicked and last quad (four-point polygon) taken as its opposite corners, which must consist only of quads. This grid (a quadrangular area that consists of four-point polygons) can be expanded and contracted by dragging any of the corners(1) or sides(2), and can also be slid along the surface of the base object while keeping its polygon count by dragging the center(3). Also, right-clicking and dragging will rotate the grid to change its top-left corner.

There is a handle called the height handle, which extends from the top-left corner of the grid in the normal direction. Left-clicking and dragging on this handle will adjust the **Height** of parts objects, and you can also adjust the **Offset** (the distance of shifting along the surface normal) by holding the CTRL key down and dragging it.



Operation - has two options available when **Free** is chosen as the **Grid Type**.

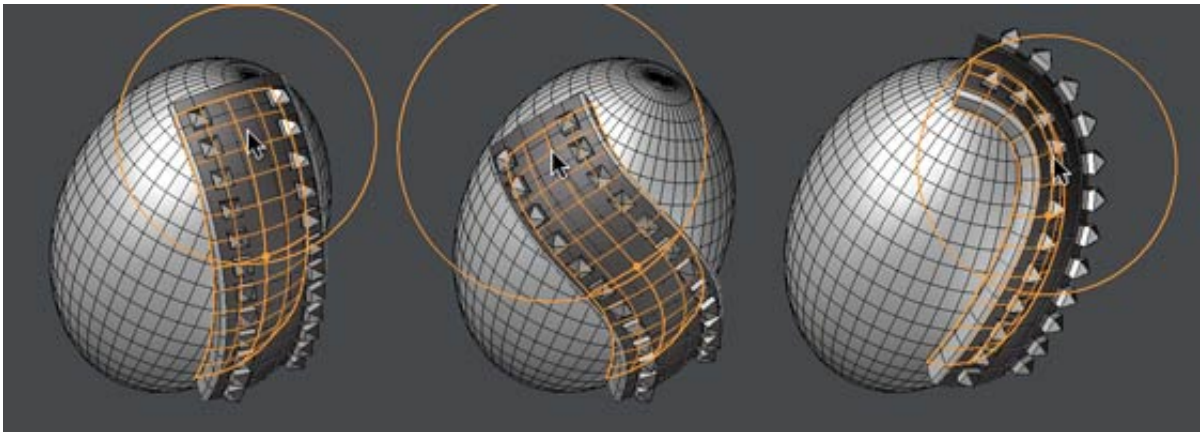
Translate - translates the current placement area grid along the surface of the current part of the polygons or onto the surface of another part of the polygons. You can slide the grid along the surface by left-clicking and dragging on the grid, or by left-clicking on the surface of the base object except the grid. Right-clicking and dragging will rotate it, and holding the CTRL key while dragging will constrain the rotation angle to 15-degree increments. Since LightWave 11.5, you can also scale the grid along the surface by holding the Shift key down and dragging your mouse.



In this mode, the placement area grid has four adjustment handles, Width, Depth, Height, and Rotation handles. The Width (X-axis) handle extends from the center to the right, and the Depth (Z-axis) handle extends from the center to the top. The Height (Y-axis) handle extends from the center in the normal direction. The Rotation handle is a small circle between the Width and Depth handles.

Left-clicking and dragging on the Width or Depth handle will scale the grid independently along the its local axis, and holding the CTRL key while dragging will scale the grid uniformly along each axis. Left-clicking and dragging on the Height handle will graphically adjust the **Height** of parts objects, and you can also adjust the **Offset** by holding the CTRL key down and dragging it. The Rotation handle allows you to rotate the grid with the amount of the handle movement, which is constrained to be on an arc of a circle. These handles are very useful for graphically adjusting the dimensions of the object placed on the grid.

Slide - deforms the grid with a simple brush. You can graphically adjust the **Brush Radius** by right-clicking and dragging, and can tweak and slide the part of the grid within the brush's influence area by left-clicking and dragging on the grid.



Stiffness - specifies the stiffness of the grid mesh. Larger values of **Stiffness** will try to maintain the surface area of the grid much more strongly, and smaller values will allow much more stretch of the grid.

Brush Radius - shows and specifies the radius of the brush. In other words, this is the distance between the position of the mouse pointer (center) and the boundary of the brush's influence area.

Brush Resizing - has the following two options for brush resizing:

> **Reset** - The **Brush Radius** is reset to zero by right-clicking.
>
> **Retain** - The **Brush Radius** starts from the current **Brush Radius**.

Falloff Slider - This is the LightWave-style falloff setting. How the effect falls off is determined by the two sliders. You can use the **Presets** pop-up menu to quickly set up common falloff curves.

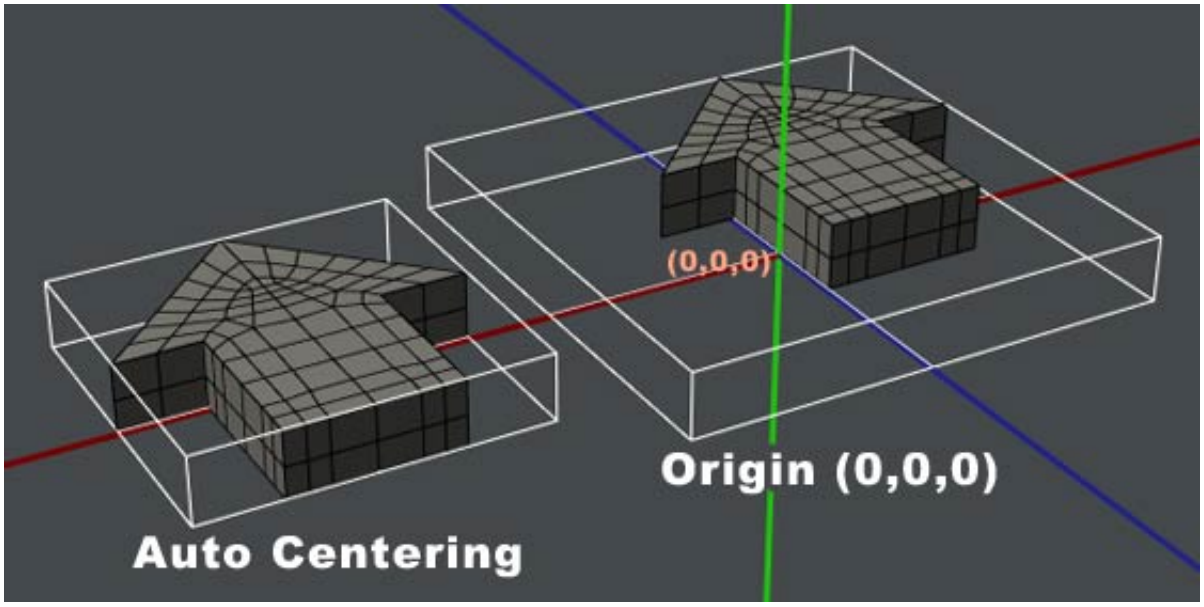
Height - shows and specifies the height of objects placed on the grid. When you first click on the foreground object, the **Height** value will be automatically taken from the height (in the Y-axis direction) of the original object in the background. You can interactively get the results while adjusting this value to scale the placed objects in the height direction, without changing the original size of the background object.

Offset - This is the distance of shifting along the surface normal, usually set to zero, which will make the placed objects get in contact with the surface of the foreground object. Positive values will cause the placed objects to float up off the surface of the foreground object, and negative values will cause the placed objects to sink through the foreground mesh.

Retain Dimensions - When checked, the dimensions of the whole parts object, including the **Height** and **Offset** values, will always be retained until you directly change them, or until the background object is changed. This can be useful for repeatedly performing a placement with the same background object. However, the grid deformation added in **Slide** mode doesn't remain. If you always want to start a new placement with the original size of the background object, uncheck this.

BG Center - chooses how the center of the background object is determined, from the following two options:

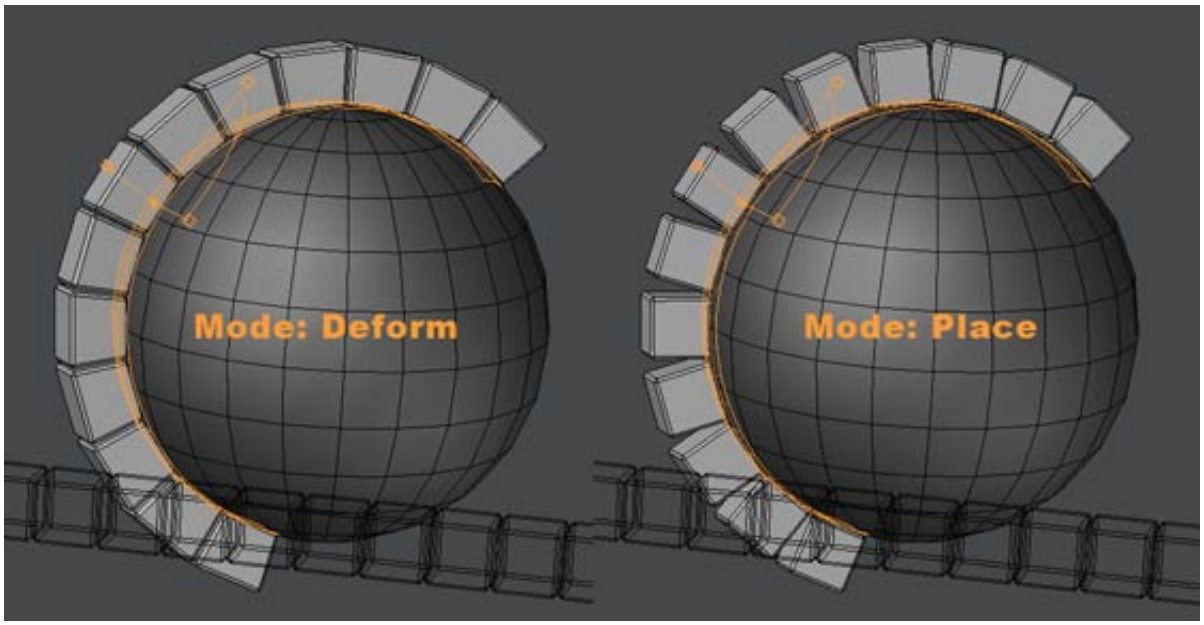
> **Auto Centering** - automatically takes the minimum bounding box enclosing the background objects. Its bottom center is the center point of the parts object, which is going to be placed on the center of the placement area grid.
>
> **Origin (0,0,0)** - The bounding box of the background object is formed with the origin (0,0,0) as its bottom center.



Mode - chooses how the parts objects are placed on the foreground object, from the following two options:

Deform - A copy of the whole background object is placed on and deformed along the surface of the foreground object.

Place - treats the whole or each polygon island (a group of interconnected polygons) of the background object as a rigid body, and places a copy of them on the surface of the foreground object.



Grouping - chooses how the polygons of the background object are grouped into parts when **Place** is chosen as the **Mode**, from the following three options:

One Piece - treats the whole background object as a rigid body.

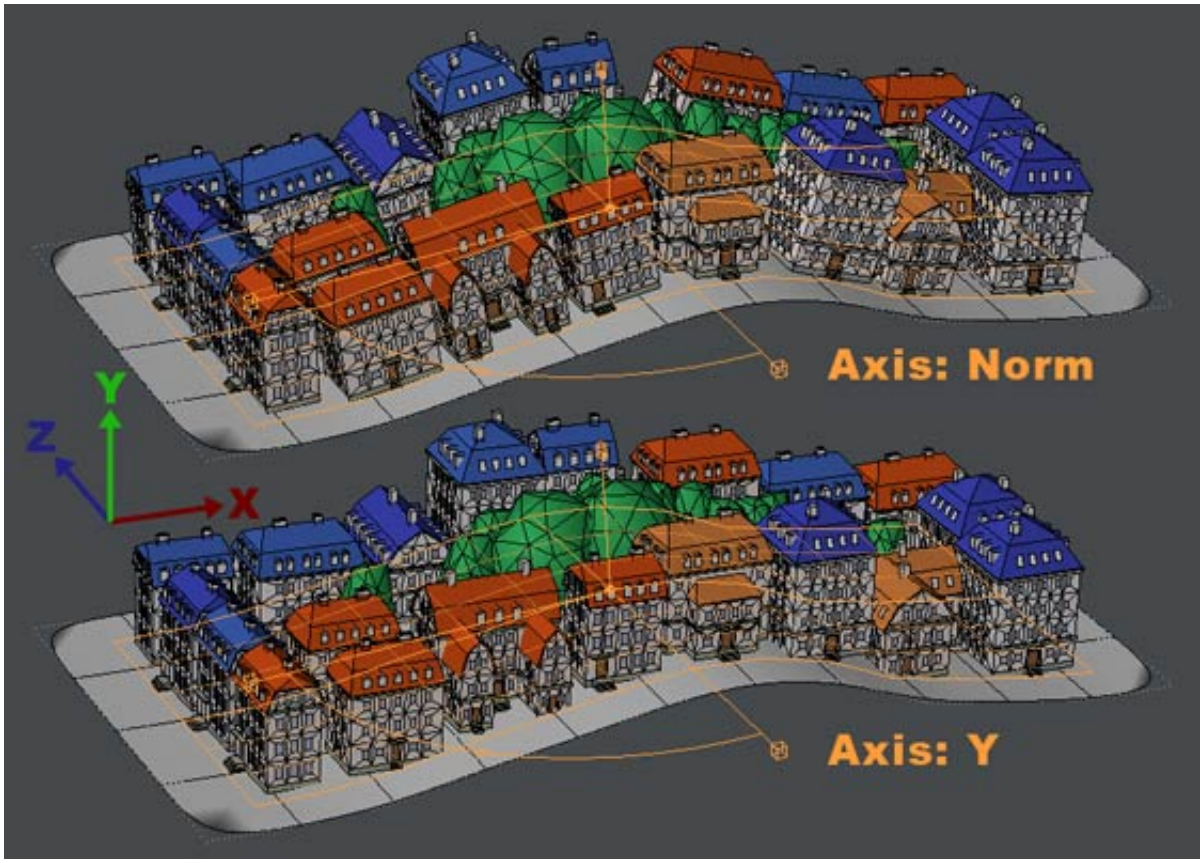
Interconnected - treats the polygon islands as rigid bodies.

By Layer - treats the whole polygon mesh in each background layer as a rigid body if multiple layers are set to be in the background. This works the same way as **One Piece** with one background layer.

Axis - chooses with which axis the up-vector (Y-axis in the background) of each placed parts object will be aligned when **Place** is chosen as the **Mode**, from the following four options:

X, **Y**, **Z** - aligns them with the chosen axis.

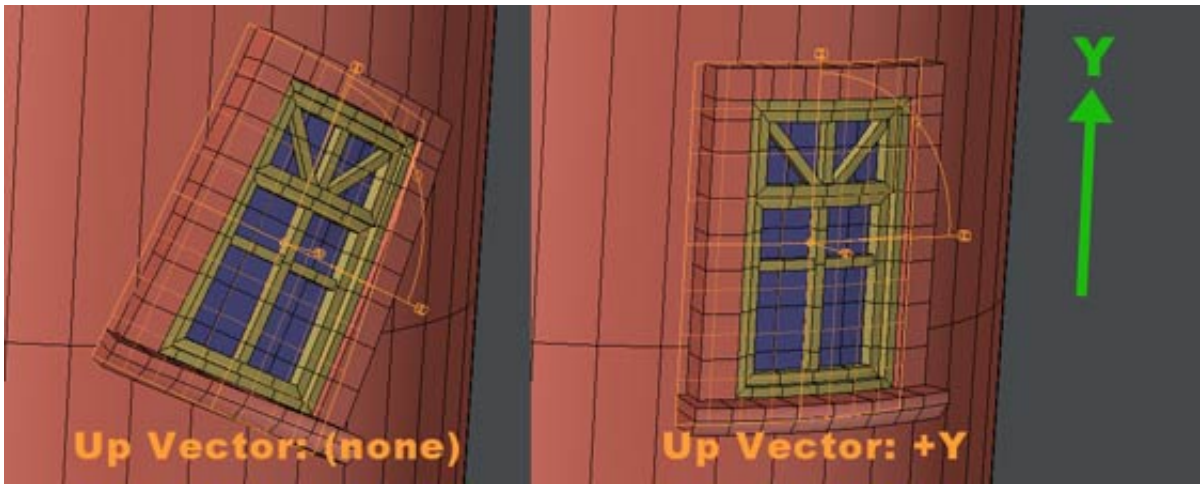
Norm - aligns them with surface normals of the foreground object.



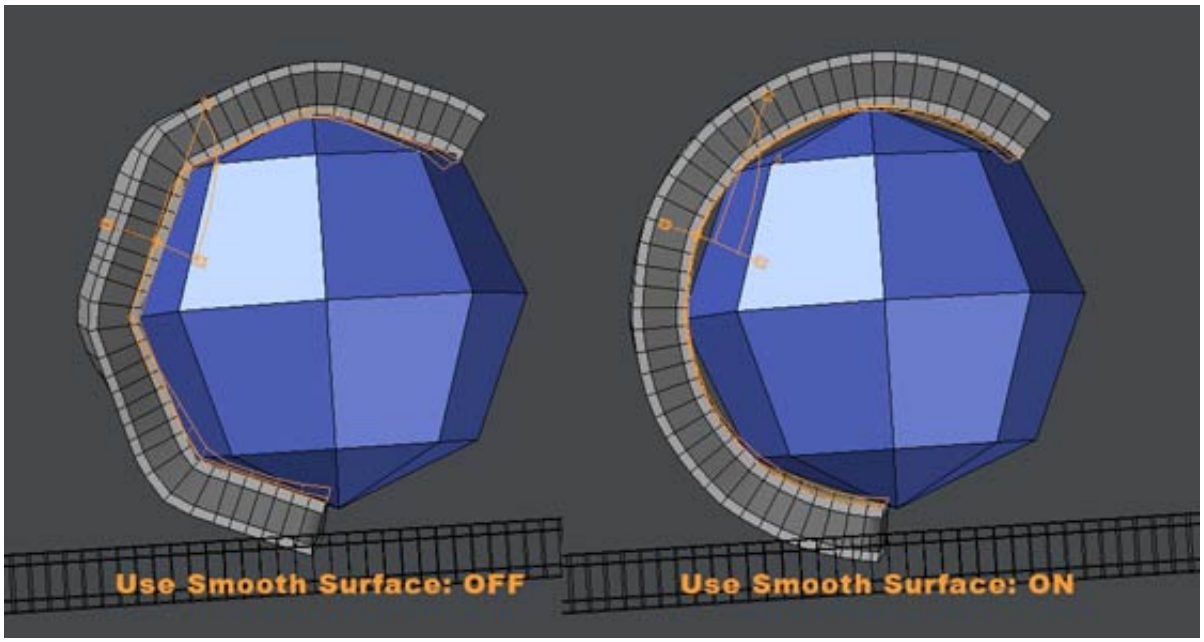
Pressure - determines how forcefully the placement grid mesh will be pressed against the surface of the polygon mesh. If your polygon mesh is rough and bumpy, you might get unexpected results with wrinkled and folded placement grids. In this case, higher **Pressure** values could make the results more desirable.

Resolution - lets you select the mesh resolution of the placement grid from the pop-up menu. Lower settings make the grid resolution lower, and higher settings make it higher. Using higher resolution settings than necessary will only degrade performance with nothing to be improved. This should always be set an optimum setting for having the grid mesh flexible, as low as possible.

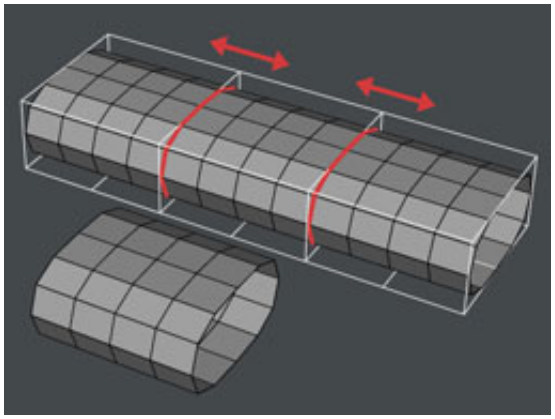
Up Vector - If any of the directions is chosen from this pop-up menu, the placement grid will try to automatically rotate so that its up-vector (as seen from the front side of the surface of the foreground object) will face the chosen direction, and therefore it will not be able to be manually rotated. This is useful when you want to repeatedly create a copy of the parts object, facing a specific direction, for example, if you want to place windows on the outer wall of a house, you may choose **+Y** (the positive Y direction) as the **Up Vector**.



Use Smooth Surface - If checked, the placement grid will slide along a virtual surface smoothly interpolated from the polygonal mesh of the foreground object. If unchecked, just along the faces of the polygonal mesh. In case you need to place something on a subdivision surface object, it would be better to check this option.

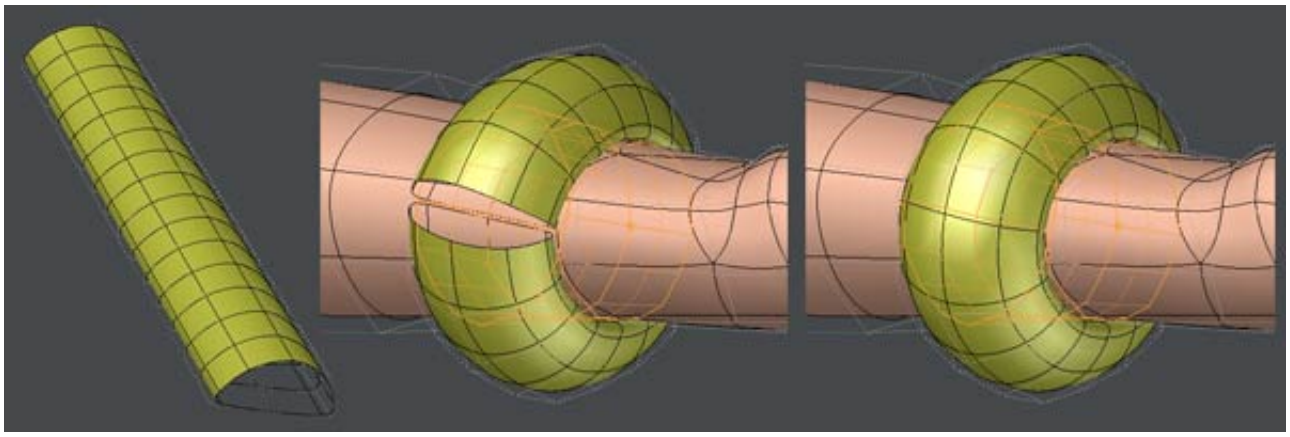


Snap - If checked, when you slide a placement grid, its center point can be snapped to one of the existing points or to the closest point on the nearest polygon edge. This is useful when you need to set something in the chosen place, for example windows, pillars, and rivets. In this case, it may be necessary to add guide points or guide polygon edges to the foreground object.



Make Loop - Checking this will allow the points of the open edges (one unshared by multiple polygons) of the parts object to be merged, which must be located exactly on each of the opposite side faces of its bounding box. When each side get near enough to be merged to each other, this merging can happen. In order to correctly perform this, it is necessary to give the perfect connect-ability of pairs of opposite sides to the parts object in the local coordinate space (in the background), that is, mergeable. In other words, if you place duplicate copies of the parts object with their bounding boxes side by side, in contact with each other, and use the Merge Points command

(default keyboard shortcut M), those points must be merged. If you want to get the resulting object in the shape of a loop, you will have to create a background object satisfying the conditions mentioned above before running the 3D Sticker tool.

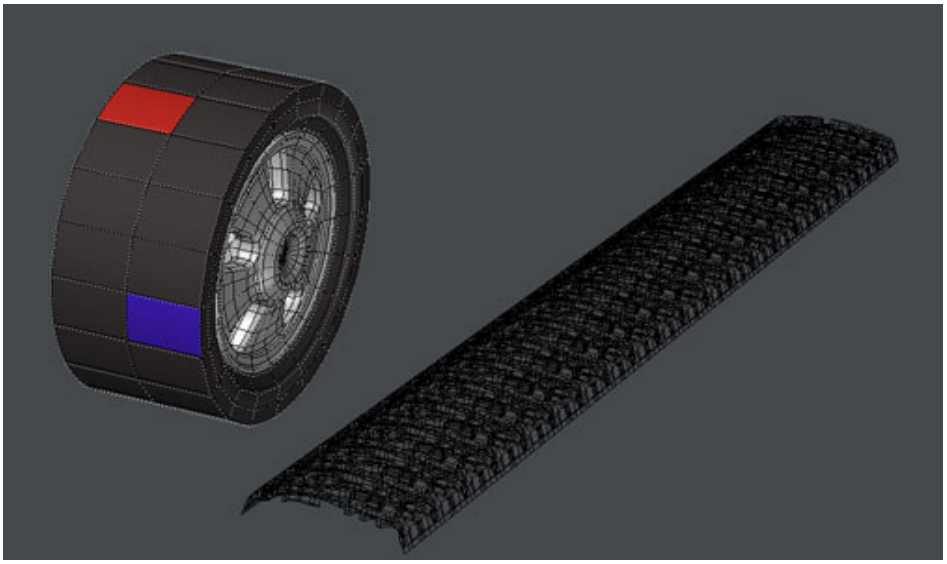


Show Grid Only - If this option is checked, the placement grid is shown in the viewports when active, but a copy of the background object will not be placed on it. If the placed objects interrupt the view you are trying to carefully and exactly decide on the placement area, you may want to temporarily enable this.

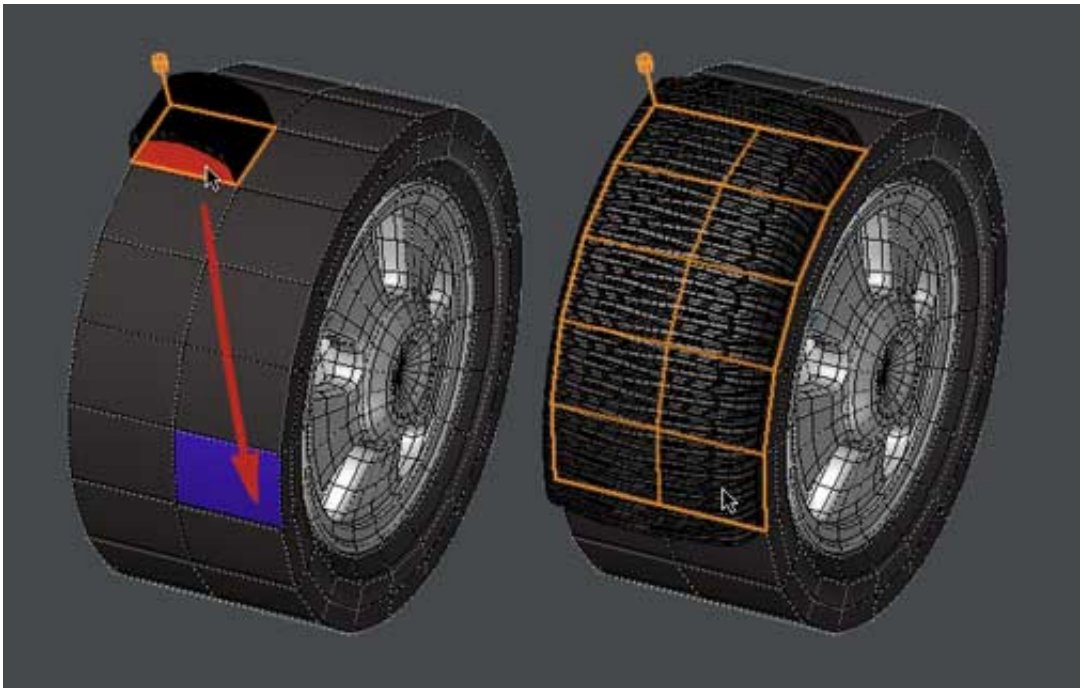
Undo/Redo - can undo and redo almost all of the changes you made while working with the 3D Sticker tool. This tool has its own undo/redo mechanism available when working on your objects. The undo/redo stack will be retained until you exit the tool, and when the tool gets deselected (when you exit the tool), it will be cleared. When you accept the current result, only the final one is stored in the LightWave's undo/redo stack. Since LightWave 11.5, the LightWave's built-in undo and redo commands can also work for this tool, not only the **Undo** and **Redo** buttons on the tool panel.

Example 1: Creating a Grooved Tire

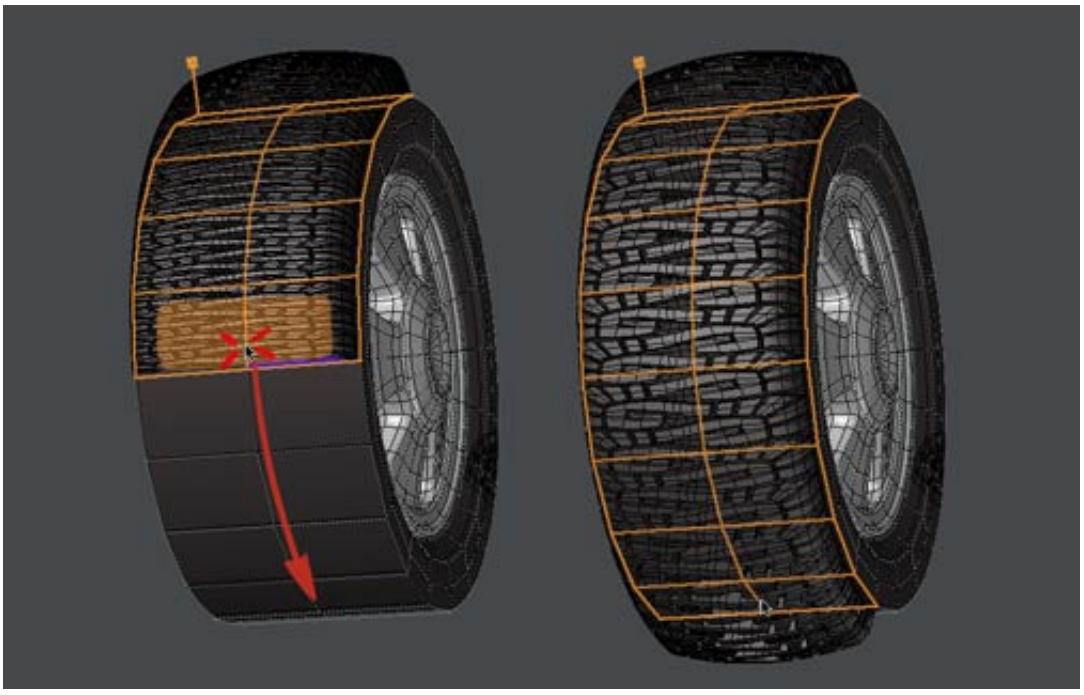
In Modeler, we've loaded the "Tire.lwo" file found in the content. The wheel object has appeared in the first layer, and the belt-shaped grooves object in the second layer. With the wheel object in the foreground, and with the grooves object in the background, we'll select the 3D Sticker Tool to make a grooved tire from these two objects.



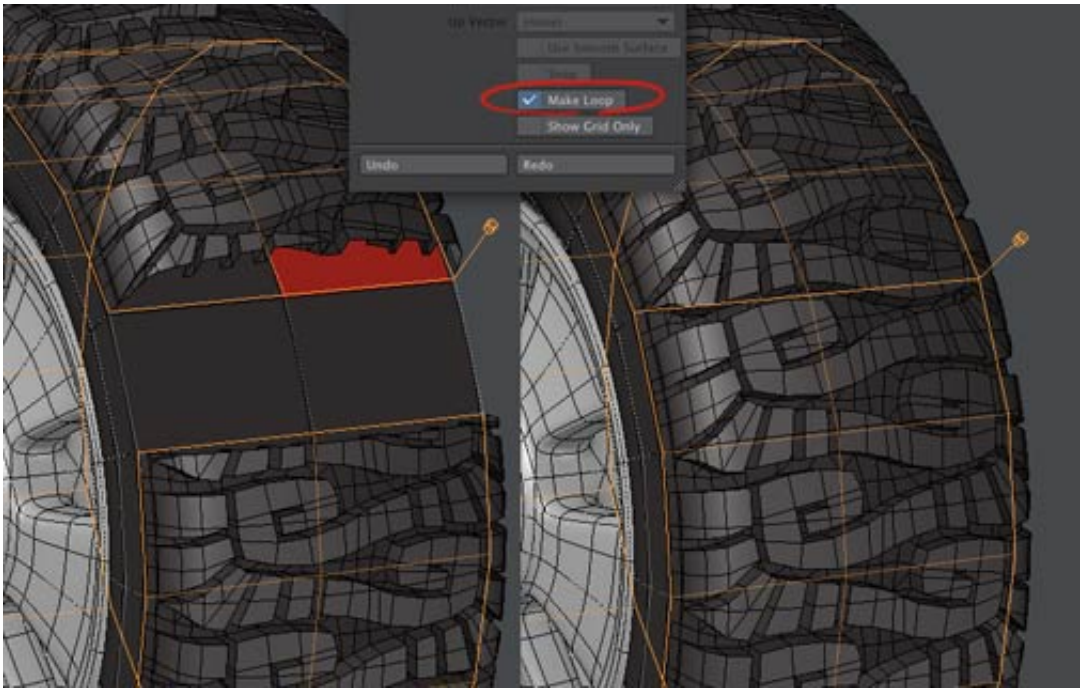
First, we've made sure the **BG Center** is set to **Auto Centering** and that the **Mode** is set to **Deform**. Then, after switching to the Quads grid mode by clicking on the **Quads** button of the **Grid Type**, we've left-clicked on the red polygon (colored just for this tutorial) on the side of the wheel object and dragged the mouse pointer onto the blue polygon. As seen in our viewport, interactively, the placement area grid has been spread along the surface of the foreground object, and the background object has been placed on it.



We'll left-click on the bottom side of the placement grid and drag it down to expand it along the side surface of the wheel object, and we'll repeat this until it reaches the same place as its opposite side.

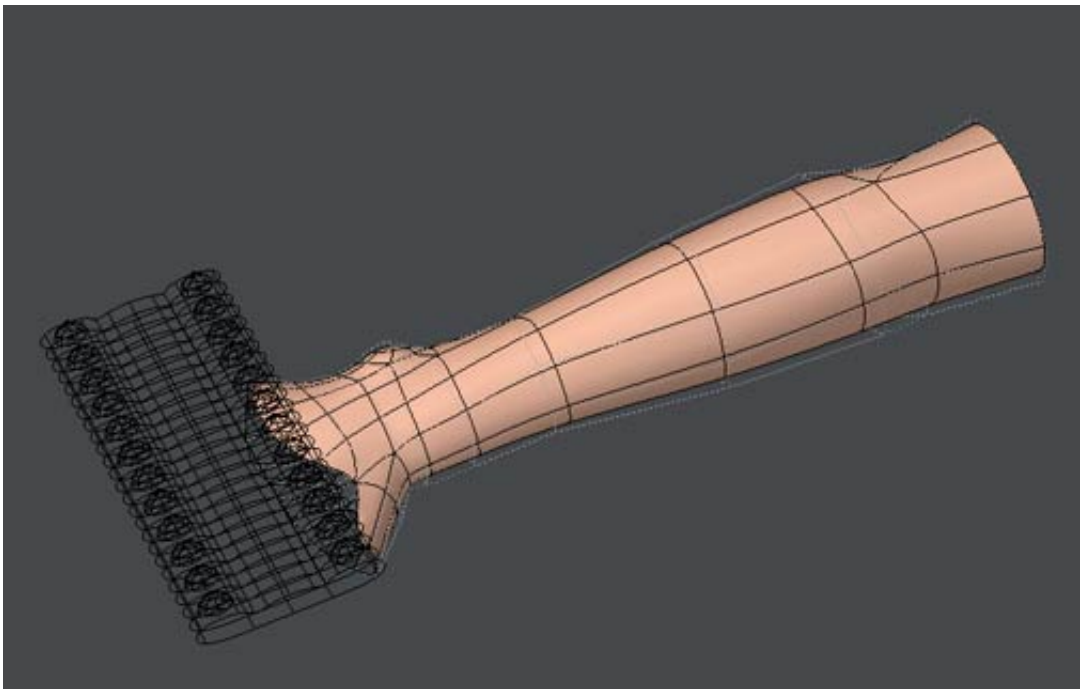


We've checked the **Make Loop** option to merge the points of both ends. Because this grooves object already has the perfect connectability of both ends, it has been performed without fail. (For more information about the connectability of sides, see the **Make Loop** section above.) Finally, we'll tap the spacebar to accept the current result.

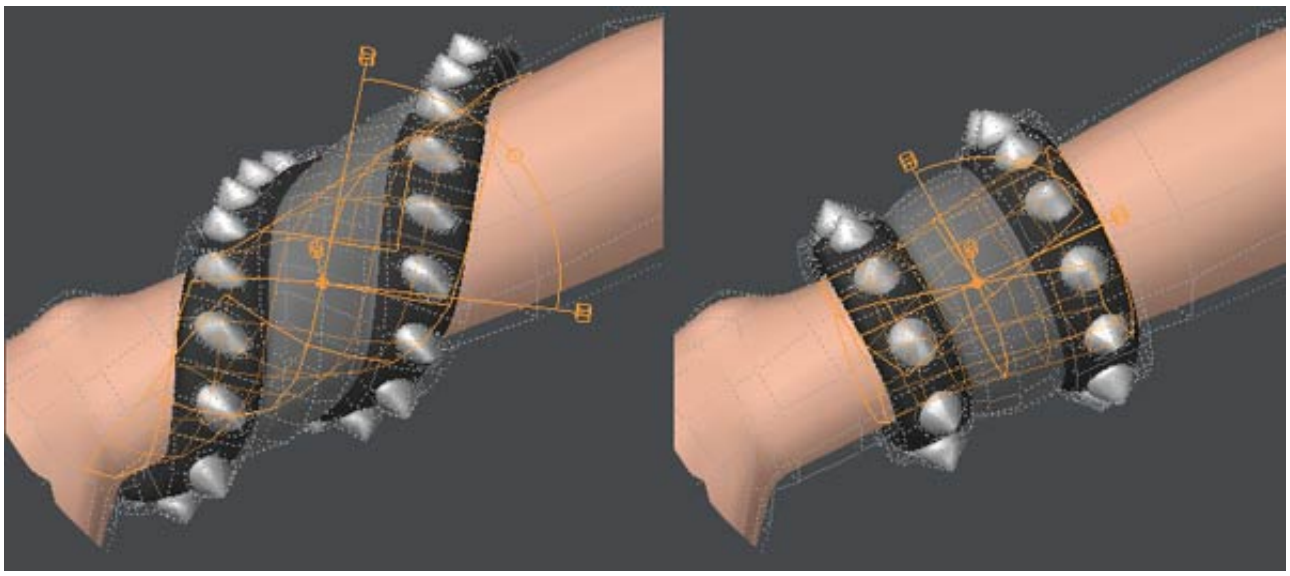


Example 2: Putting a Wristband onto the Wrist of a Character

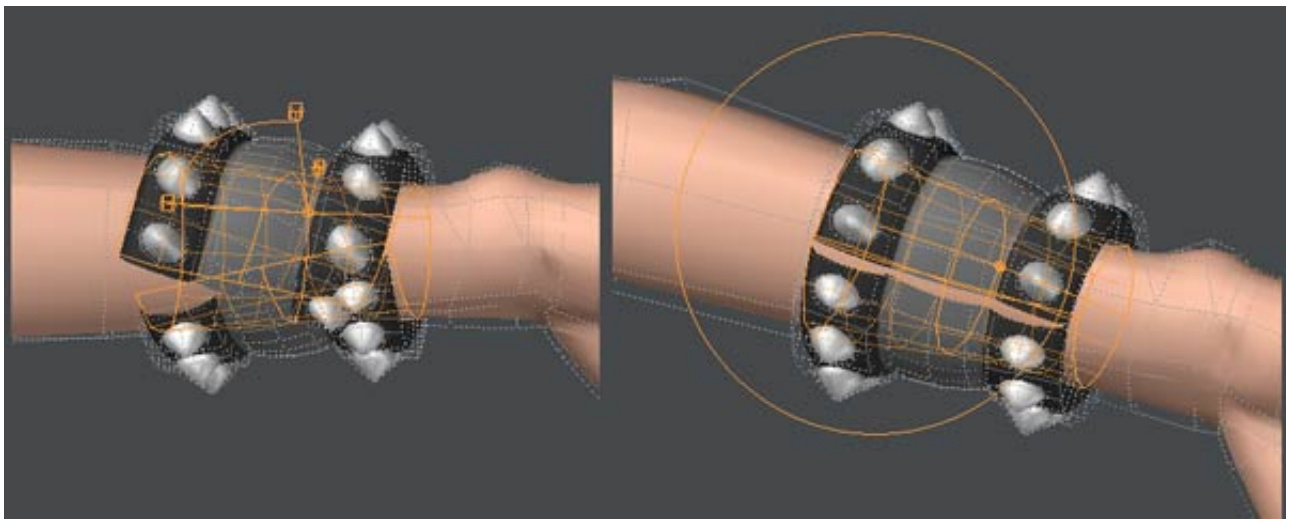
We've loaded the "WristBand.lwo" file found in the content. The character's forearm object has appeared in the first layer, and the belt-shaped wristband object in the second layer. With the forearm object in the foreground, and with the wristband object in the background, we'll select the 3D Sticker Tool to put the wristband onto the wrist.



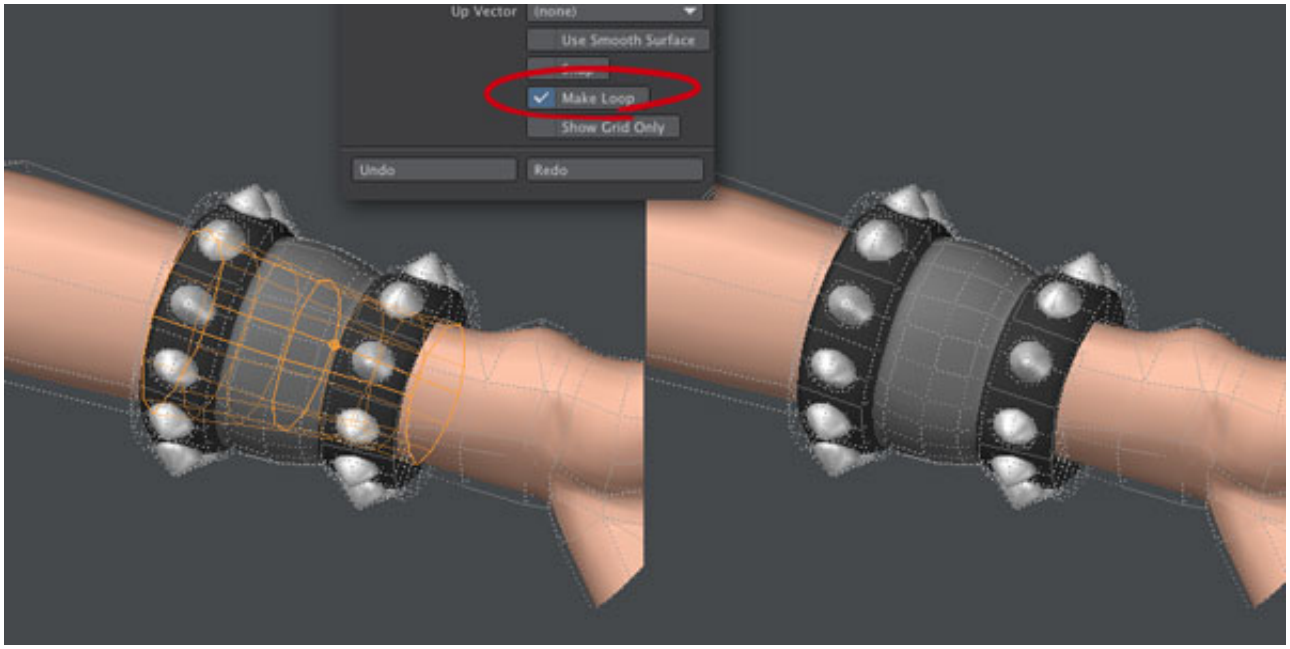
First, we've made sure the **BG Center** is set to **Auto Centering** and that the **Mode** is set to **Deform**. Then, we've set the **Grid Type** to **Free** and set the **Operation** to **Translate**, after that, we've left-clicked on the surface of the wrist. Now, in our viewport, we see that the placement grid and the wristband object are wound around the wrist, but it may be facing an undesired direction. So, by right-clicking and dragging our mouse left or right, we'll adjust its direction so that its both ends will be in nearly the same place.



We've rotated our perspective view so that the back side can be seen. Then, after switching to the Slide mode by clicking on the **Slide** button of the **Operation**, we'll deform the placement grid to refine the shape of the wristband. **Stiffness** values of about 40 will allow moderate deformations of the placement grid. Right-clicking and dragging will graphically adjust the **Brush Radius**. Left-clicking and dragging on the placement grid will move grid points within the brush's influence area, and grid points around them will also move.



We've checked the **Make Loop** option to merge the points of both ends, and finally, we'll make sure these points are correctly merged and tap the spacebar to accept the result.



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