



## RANDOM FLOW OPERATOR OVERVIEW

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# INTRODUCTION

Random Flow is a collection of randomizer functionalities that can quickly create 'random' shapes and details from a source mesh. The whole operation is non-destructive with the resulting meshes added to the scene as separate objects.

Why did I create Rflow? It's very simple. So users/artists can have fun and forget the woes and stress of hours of manually modeling meshes because if you ain't having fun, you ain't doing it right. Although, this is targeted more for the concept art crowd the effort needed to make the results from this plugin production worthy relies entirely on your 3D bending skills.

Can I drop learning anything and just rely on this add-on to do everything for me? No. This is just another tool and tools are only as efficient as the hands that wield them. Combining this with your modeling skills and use of Blender's vanilla functionalities will get you the most of this experience.

# INSTALLATION

Extract the random\_flow.py file from the compressed folder and copy/paste it in Blender's add-on folders. You can then open Blender up, press F4 in the 3d viewport and go to Preferences > Add-ons and enable the add-on there.

If you click on the arrow before the add-on name, this will show you the add-on preferences settings where you can change the hotkey needed to show the Random Flow menu in the viewport. By default, this hotkey is **Shift+Q**.

*(Do not remove the hotkey using the X button as the script template for this is bugged.)*

If you accidentally clicked it, you must set it back manually in the Keymaps > 3D View Generic using 'wm.call\_menu' as the identifier and 'UI\_MT\_random\_flow' as the name.

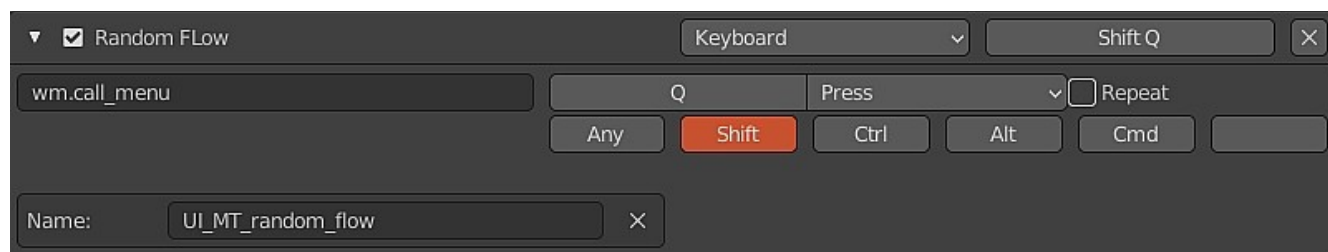


Figure 1 - Hotkey assignment menu

If you have Random Flow Lite installed before, disable this first then enable the full version. Or simply delete the random\_flow\_lite.py from the add-on directory.

# RANDOM OPERATORS

The following will be the main randomizer operators in the add-on. The parameters with \* will not be in the lite version and the ones with \*\* can only be seen in the lite version.

All these operators require face selection in edit mode and then change back to object mode for them to work.

These operators will run optimally on low res meshes or face selections. If you have a mid-res or higher mesh, it is recommended that you use them in intervals on selected areas of the mesh rather than the entire mesh at once.

The face selection all need to be quads (*although you can use tri*) for the subdivision script to work as it does not accept ngons except for some situations in Random Extrude. For Random Scatter, face selections doesn't need to be quadified at all for it to work properly.

The randomized result also depends on the face selection pattern (*can vary with face loop direction*), width and length. So in order to spice things up, you may need to actually edit some faces in the source mesh and add some topology like insetting, subdividing a bit, cutting loops in order to create variety in the result. For example, using Random Extrude on a single plane will give you even square like patterns mostly but if you subdivide it once and inset to create a face loop margin in the borders, using Random Extrude again will give you a much different result. This is also the same for randomizers like Random Panels and Random Tubes.

Always have complete situational awareness of the parameters you are modifying. You might be having fun increasing what you thought was the random seed value but it actually turned out to be the subdivision level and boom! Blender has a stroke. The freeze event is not a crash but Blender taking a long time to complete a task that involves too much geometry. If it goes past 5 minutes without responding, it's time to kill Blender and restart. That being said, save often.

If your selection involves a bit more resolution, test the waters using lower subdivision cuts in the parameters then slowly increase the levels.

The undo parameters has sliders and toggles. The sliders can be manipulated using click and mouse drag left and right, hovering over the slider and ctrl+middle mouse button roll up and down (*useful for integers*), using the arrow buttons located in each side of the slider bar or clicking on the sliders and manually entering the number values.

For the click and mouse drag, avoid using this when Blender is already lagging with the operator values involved as this will not give it time to think and complete the process for each value change. This is generally useful for editing floats, you can combine shift to slow down the increments as you drag, ctrl to increase the increments in intervals and ctrl+shift to slow down the increments in a much lower interval. As you are dragging, you can also press rmb (*right mouse button*) to cancel the value change and revert to the old value before the change.

Finally we have the undo parameters, these are the parameters you see me editing in my videos to manipulate the random events. This is also coined as undo menus and we have two kinds in Blender, one that has an OK button and the other which has not. The OK buttoned menus will only activate once you press the ok button and the other one will activate as soon as you edit one of its parameters. All of the random operators now will be the latter.

If you navigate while editing the parameters, the menu will close but you can call them back using the F9 hotkey (*remap this at your convenience*). As long as you have not entered a command which has an undo menu registered in Blender, you can keep calling the previous operation's undo menu using the F9 hotkey. Can you change this behavior? Nope. Internal.

## RANDOM EXTRUDE

The Random Extrude operator creates extrusions on randomized faces from the original face selection in the source mesh. The faces are randomized per loop and each loop will represent a new object added in the scene.

The randomized elements are based from the previous loop e.g. randomized faces in loop 1 object comes from the source mesh, randomized faces in loop 2 object comes from the loop 1 object and so on.

### Undo Parameters

Parameter	Function
Loops	<p>This represents the loop objects numbered 1-6. You can toggle a single item by clicking on it and select multiple/remove items by pressing Shift and left clicking on the numbers.</p> <p>All loops will still be processed even if you only have loop 3 activated with loop 1 and 2 off. This is because the results of each loop depends on the previous one.</p> <p>Activating a loop will create that loop object in the scene. The operator will only fully activate if a single loop object is added to the scene.</p>
Loop Ratio	Determines the amount of faces to be randomized starting from the original selection in the source mesh.
Loop Seed	Seed value to determine a fixed randomized result from the loop ratio result.
Loop Inset Depth	The maximum height of the extrusion

	allowed to be randomized.
* Loop Depth Seed per Loop	Seed value to determine a fixed randomized result from the loop inset depth. These can be set per loop.
** Depth Seed	Seed value to determine a fixed randomized result from the loop inset depth. This is a universal value for all loop objects.
Panel Size	<p>This only works for the loop 1 object and determines the amount of neighboring faces to be included in the randomization.</p> <p>This basically creates face islands which will be randomized per ratio as to what to keep or remove.</p> <p>The rest of the loops will not use this randomization method and will use normal per face randomization.</p>
Min Depth	The minimum inset depth allowed for randomization.
Subdivide Loop	<p>Subdivides the first loop with the desired number. Next loops will be subdivided once.</p> <p>With Exponential Subdivision on, all loops will be subdivided using the same number (Slower).</p> <p>The amount/ratio of faces randomized will be affected by the number of subdivision.</p>
Subdivide Base	<p>Subdivides the face selection in the source mesh. This will affect the randomization ratio for the first loop object and ultimately the proceeding loops in the process.</p> <p>This will also affect the Subdivide Loop</p>

	parameter as the loop objects will use more faces from the base.
* Cut Off	<p>Determines the angle threshold of edges to cut when the Inset Individual toggle is off.</p> <p>The inset method extrudes faces via face regions instead of individual faces when Inset Individual toggle is off so cutting edges at desired angles will result on even extrusions.</p> <p>Generally, the 30° default value works for most angular objects.</p>
Material Index	Lets you assign materials from the source mesh to the loop objects. At default value of -1, it will use the source mesh's active material if it exists. Going past this value, you are using material assignment per index. 0 means the first material in the material stack and 1 is the next one.
Exponential Subdivision	If toggled on, the proceeding loop objects from loop 1 will use the same number of subdivision cuts if not they will only use 1 cut per loop. (Slower but will create smaller shapes)
Quads Only	All randomized faces will only be quads. This does not turn faces to quads but will only select quad faces to randomize.
Subdivide Faces	<p>The default subdivision solver will only subdivide the edges. Turning this on will use grid subdivision and subdivide the faces normally resulting to more faces.</p> <p>This is a much slower solver and will always default to off in every operation for safety</p>

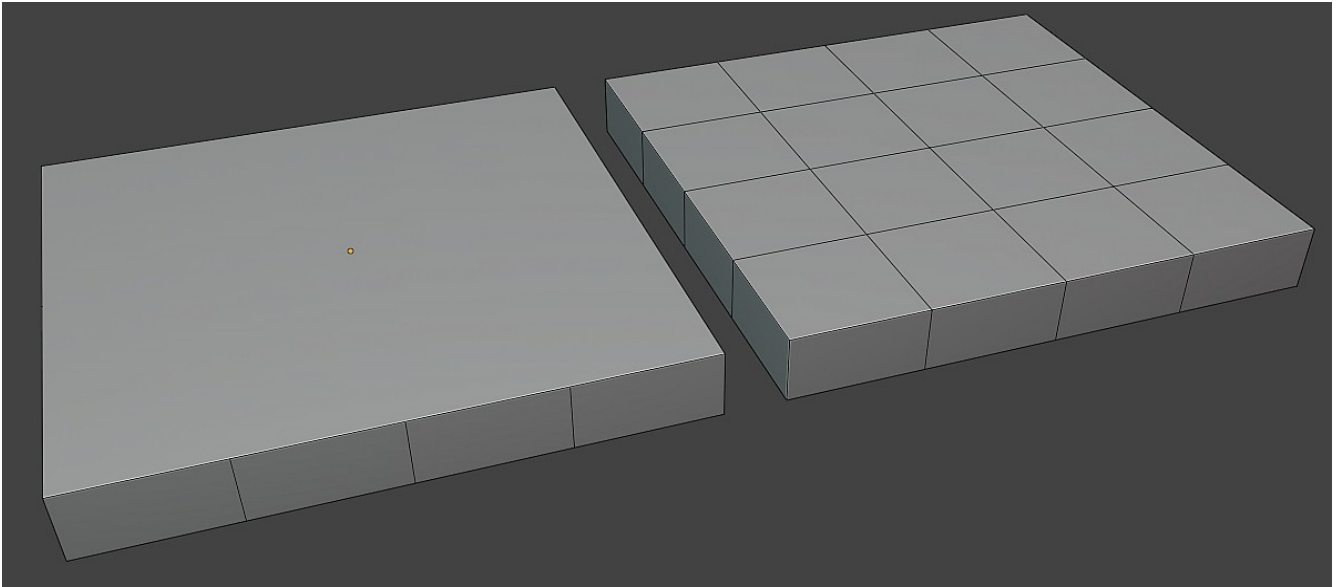
	<p>reasons</p> <p>Normally, using the original solver will result in more interesting/usable shapes but only exposed this for variety.</p> <p>Be aware of the subdivision levels before trying this because it can cause Blender to have a stroke and freeze in high values.</p>
Original Only	All loop object results will be randomized only from the source mesh.
Inset Individual	If turned on, randomized faces will be extruded individually instead of per face regions.
Face Islands	Splits faces by region when Inset Individual is off and by individual faces when it is on. You'd have this on normally, since it can cause geometric distortions on most non-planar selections.
Clip Center	<p>Clips vertices using a merge distance from axis centers when a mirror modifier has been inherited from the source mesh. This also removes clipped faces which results from extrusions in that area.</p> <p>(Minimal impact on speed)</p>
Clip Distance	The distance from which to clip verts to the activated mirror axis from.
Dissolve Edges	<p>This dissolves edges based on an angle threshold. It's basically another form of decimation tool but instead of triangles it creates quads/ngons by removing edges and verts depending on the face angle.</p> <p>I have this on normally since the original</p>

	<p>subdivision solver only subdivides edges – this creates vertices only on those edges and when this face is extruded those subdivided edge will create quad faces where most of the faces used for the randomization will be. This will however, leave the original face riddled with vertices that aren't connected via grid unless you use this parameter to clean them up.</p> <p>(Minimal impact on speed)</p>
Max Angle	Determines the maximum angle to dissolve edges.

Wow! That's a lot of buttons! Am I gonna push everything here? No. As for every operators, there are the main settings and the rest would be corner-use case scenario. What I mostly tinker with these are the number of loops, their face ratio, its seed randomization, the inset depth randomization seed, panel size, subdivide loops and subdivide base. This is also true for the rest of the random operators although using different parameters.

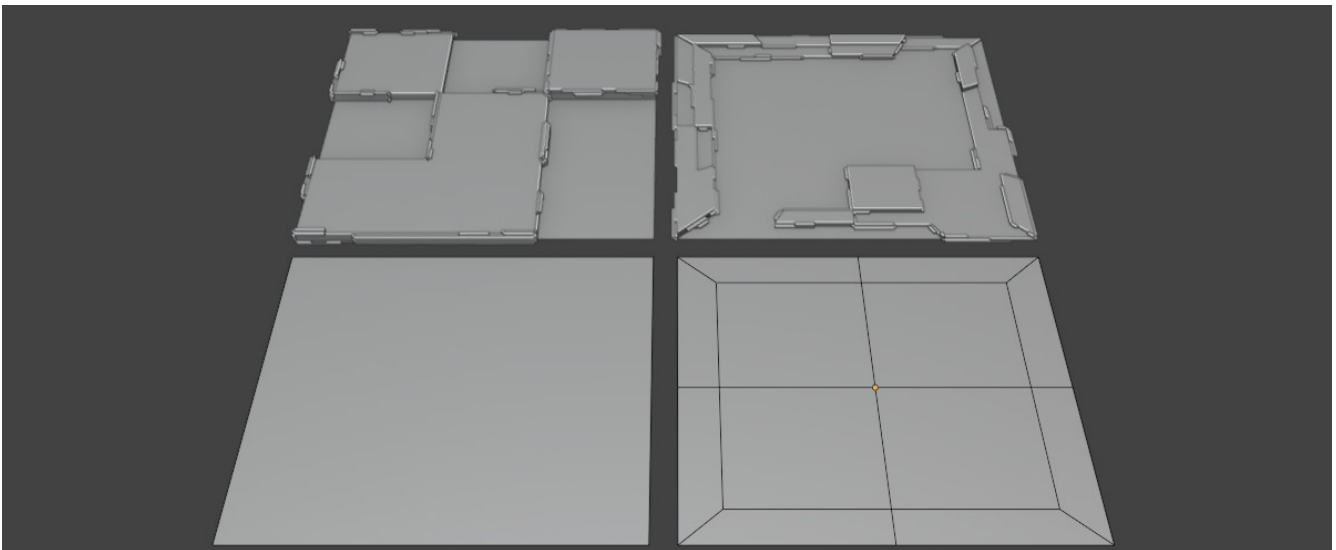
The loop objects result can change depending on what modifications you did in the previous loop object. For example, you set the loop 2 object ratio to 0.2 (20%) then loop 3 object can only work on that amount of faces. Setting loop 3 to 1.0 (100%) means you are using all the 20% of faces loop 2 object randomized from the loop 1 object.

Next page will be a synopsis of some of the inner workings of the operator. Each operator chapter will have this so you can have a better idea of how they work in code level.



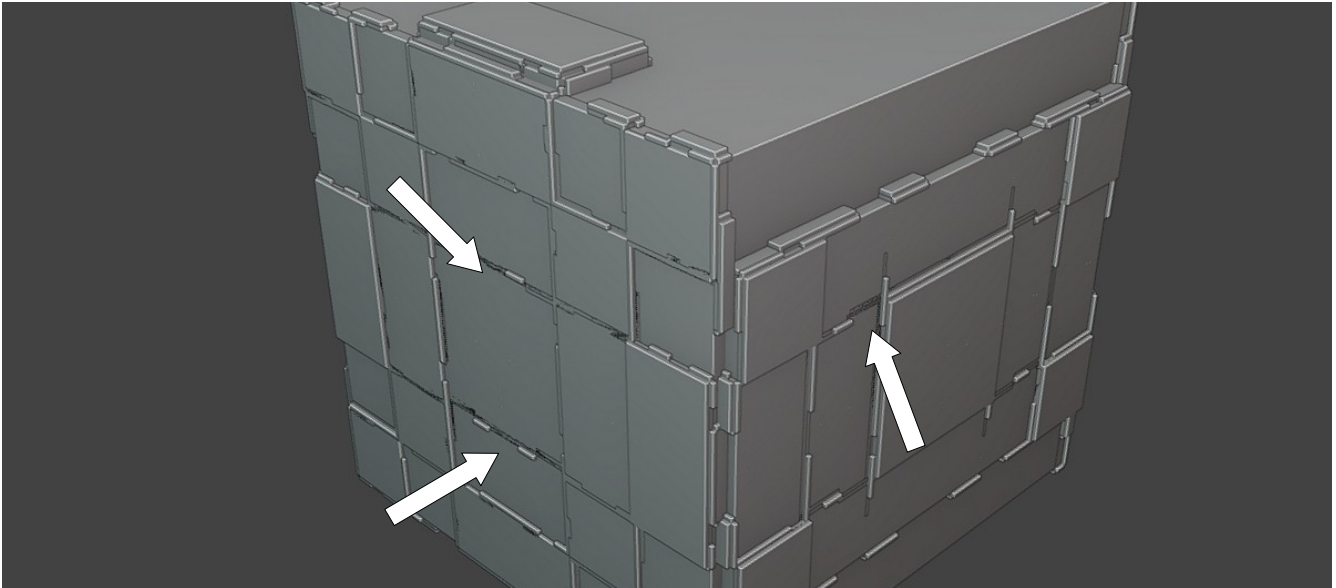
*Figure 2 - Two of the main subdivision solvers*

The image above shows how the original solver subdivides in the left and with Subdivide Faces on in the right. Even the ngon face will be used for randomization in the original solver but you can see how the increased number of faces in the right can affect the speed and result of the randomization. Most of the smaller faces from the original solver in the left will come from the sides.



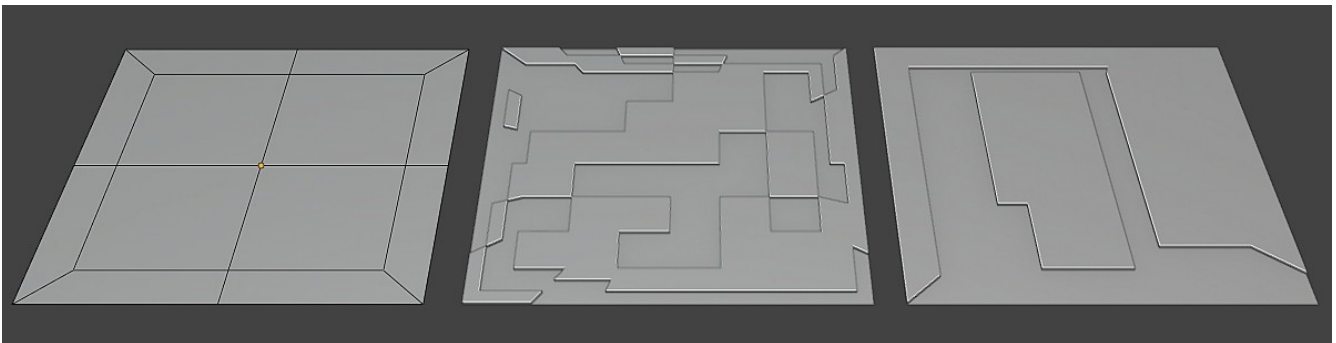
*Figure 3 - How face selection affects randomization results*

In figure 3, you can see what I mean about how the topology and selection pattern affects the results. In the left, Random Extrude was used on a basic quad plane and in the right, the plane was subdivided once and inset.



*Figure 4 - Overlap faces caused by extrusions on side faces*

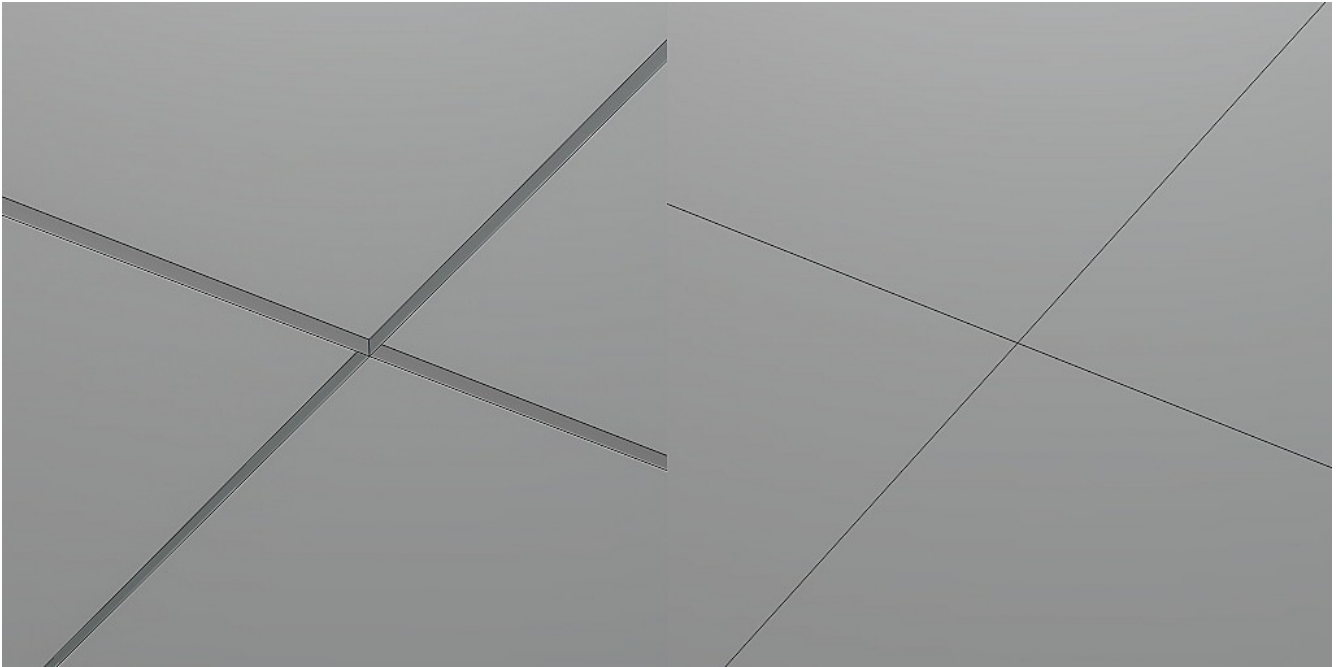
Turning on Inset Individual will split the faces individually and give out more shapes since each edge of the face will be subdivided like in Figure 2 but will also create overlap faces indicated by the arrows in the above image. This means that those faces are created from the sides and their depth direction extrudes to the sides as well, their height will be equal to their parent face's depth value going outward causing the overlap. You can fix some of this by changing the seed value of the ratio but not all. I have this off most of the time so faces are split via region eliminating most if not all of these overlap events.



*Figure 5 - Size of face islands based on panel size*

You can see the effect of increasing the panel size in Figure 5. With the left mesh is used as the source, the object at the middle is the result of 4 base subdivision and 0% panel size while the right object is the result of 4 base subdivision with 30% panel size. While increasing the panel size increases the area of the face islands, this does not mean that all islands generated are big. You will still get

smaller islands using the seed value since they're basically the ones that got robbed of area while the script created the face islands to randomize. This only happens in the first loop object and the rest of the loops will randomize faces individually and producing islands this way only results from a complete random event but increasing the ratio will also greatly affect this chance.

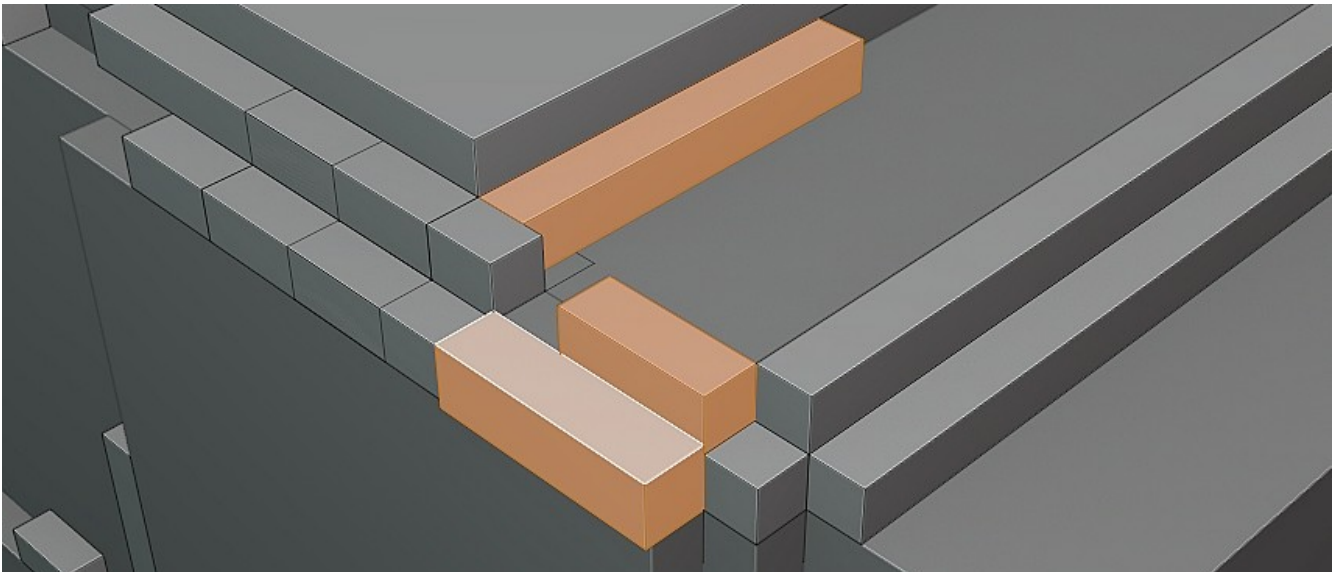


*Figure 6 - "Face doubles" in mirror center axis*

Left side of Figure 6 shows the geometry in the center axes when the randomized objects inherits the mirror modifier from the source mesh. Since the faces are inset via region or per face, faces can get like that in areas of mirror axis cuts. Using Clip Center, it will clip the vertices based on a merge distance threshold and also get rid of the faces that share the same location producing the result in the right side of the image.

This will make it possible to manually inset faces in mid regions as a whole and also get rid of unnecessary topology in that area. The merge distance of 0.001 works for the default cube scale but you can increase this if necessary. Be careful of using too much since this can bunch up whole shapes in the mirror center axes.

This option is also present in Random Panels and works exactly the same way.



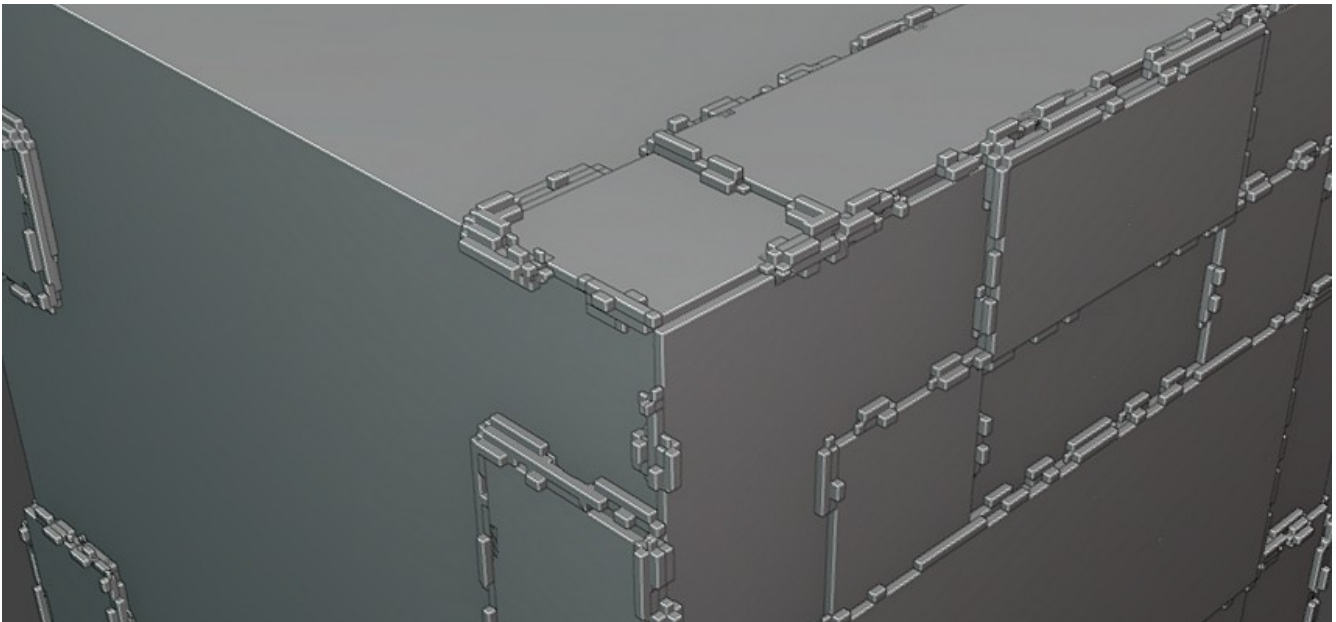
*Figure 7 - Cell or island structures*

Since all faces are split via region or individually, this creates “face cells” which you can quickly select by going into face selection mode (number 3 hotkey) in edit mode, hovering over a face and pressing the L hotkey to select all its linked faces. This makes it easier to remove parts of the random mesh that you don’t want.

This “cell” structure is also present with Random Panels and Random Scatter and you can use this method to isolate areas for editing or remove them.

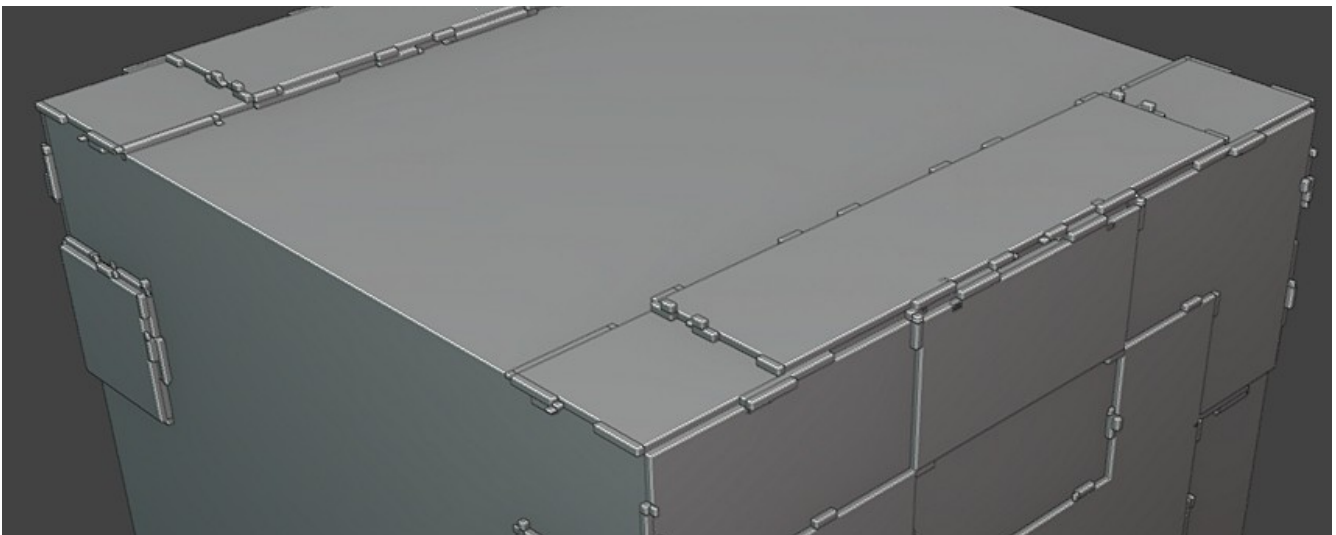
Working with the loop objects, normally you iterate through different designs using the ratio, seeds, depth etc. But you can also turn off some previous loop objects and only keep loop 3 object for example.

The loop objects stack on each other to produce different shapes. For proceeding loops past 1, depending on the subdivisions and ratio you might get smaller and smaller cells and since loops 2 to 6 uses per face randomization getting “teeth like” cells bunched up on particular areas can happen.



*Figure 8 - Teeth like details on higher subdivision levels*

Figure 8 shows the 4 loop objects in a cube using 2 loop and base subdivision with all loop ratio set at 50%. You can see that with the addition of loop 4 object, we get the “teeth like” shapes which are basically 1 to 2 face cells. Since the subdivision happens per loop, loop 4 now has more faces to randomize coming from the loop 3 object. To get bigger shapes and reduce the number of these “teeth like” details you can increase the ratio but be careful since using 100% means you basically copied the entire previous loop object.



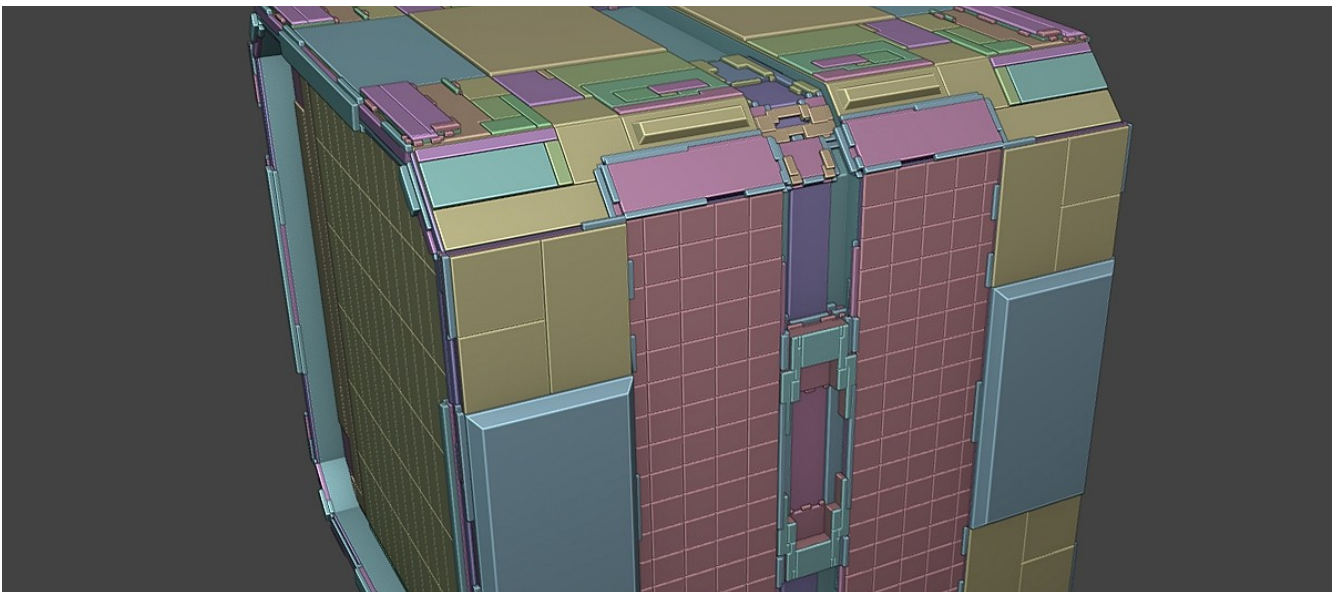
*Figure 9 - How ratio and subdivision affects detail size*

But this is not the only way, continue playing with the ratio and distribution using the seed parameter until you get a better result.

Figure 9 shows the same instance with loop 3 object using 30% faces from the previous loop and loop 4 object with 10%. All of these can still vary relative to the selected faces topology and resolution. You can also try using a lower subdivision for the loop or base to get bigger shapes as higher levels means more and smaller faces.

The face cells in all solvers will have the tendency to overlap and penetrate each other. This is unavoidable. The way the randomization works in this case to get the different shapes needed is controlled chaos. This ultimately means that out of all the random operators, this will be the hardest to convert to any production worthy mesh *(unless you use lower parameter levels and try using the operator to prototype some big shapes)*.

How many loop objects do you usually work with in your videos? I often work to just loop 3. You can go higher but remember that the faces are going to be a lot more *(affects speed)* and smaller as go up.



*Figure 10 - Crate design with randomized objects stacked or layered*

Also, don't just try and let the operators do all the work. Go inside the source object or the randomized objects to manually model some details and use these faces for a new randomization operation. You can also layer the loop object's effects by doing multiple Random Extrude on the same face selection.

## RANDOM PANELS

The Random Panel operator creates panel like details by making face islands and splitting their boundary edges to produce the effect.

This uses the same code as the panel size parameter in Random Extrude to generate the islands but utilizes them for a different result. Each island separated by the split are individual cells you can edit, separate or remove.

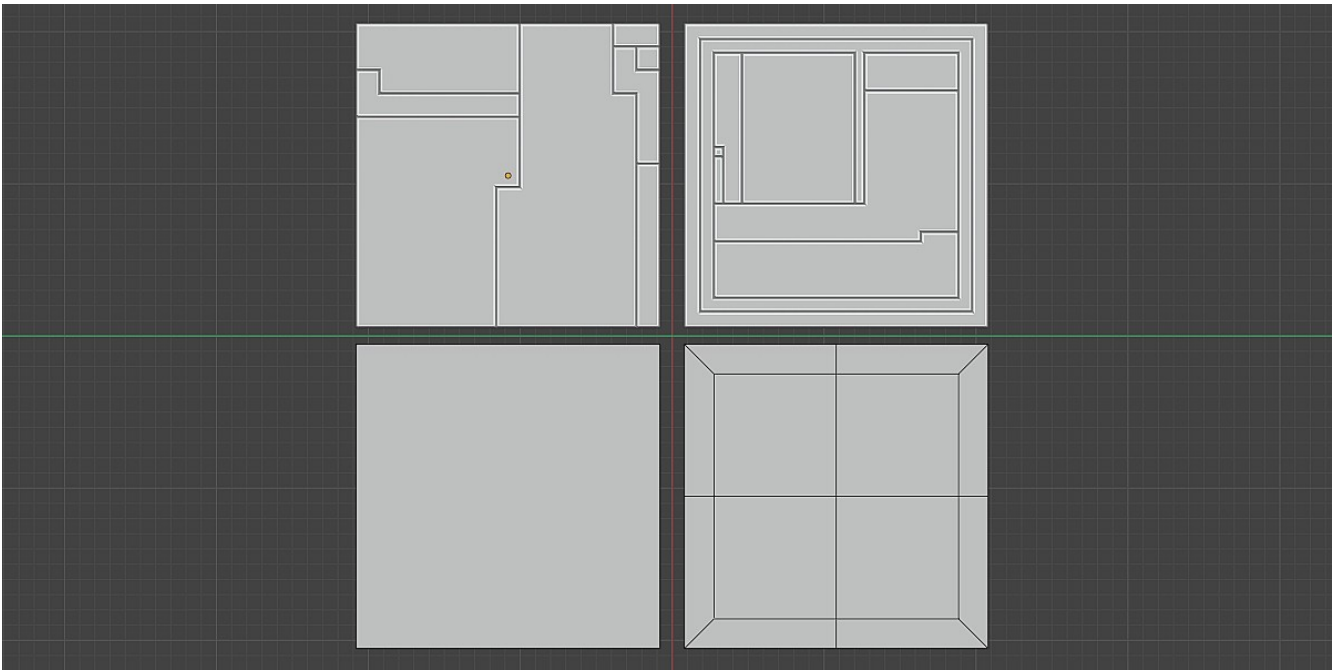
### Undo Parameters

Parameter	Function
Solver	Creates different panel patterns using the options: Face, Edge or None.  By default, this uses Face. None to Edge respectively and you get weirder patterns.
* Path	Uses the options: None, Shortest or Longest to determine which edge to favor when the script is “walking” to create the islands.
Size Mode	Use Percent to use percentage to determine the size of the islands and Number to use interger.  This ratio is determined by the total number of (subdivided) faces in the selection.
Panel Size	The size of the panels. This may vary according to the solver and path you use.
Panel Seed	Seed value to produce a randomized fixed result for the panel pattern.
Subdivision	Cuts: Determines the number of subdivision cuts to use on the selected faces from the source mesh.  Smooth: The amount of smoothing to use

	when subdividing. Useful for cylinders and curved surfaces. Typically, 0.5 works for most curvatures but increase if necessary based on what you see.
Thickness	The amount of inset thickness to use on the panel islands.
Depth	The amount of inset depth to use on the panel islands.
Cut Off	The maximum angle threshold to split the edges of the selected faces. This works separately from the main code so the islands get cut off in areas of sharp face angles to produce even depths and avoid distortions.
* Clear Faces	Uses options: None, Inner or Outer to remove faces from the panel islands.
Height	<p>The minimum and maximum height values to randomize for each panel island. This is a separate value or effect from the depth.</p> <p>This will only activate if you increase the max value past 0 as this can affect speed when used on higher resolutions.</p>
Height Seed	Seed value to produce a fixed randomized result for the height parameter.
Material Index	Lets you assign materials from the source mesh to the loop objects. At default value of -1, it will use the source mesh's active material if it exists. Going past this value, you are using material assignment per index. 0 means the fist material in the material stack and 1 is the next one.

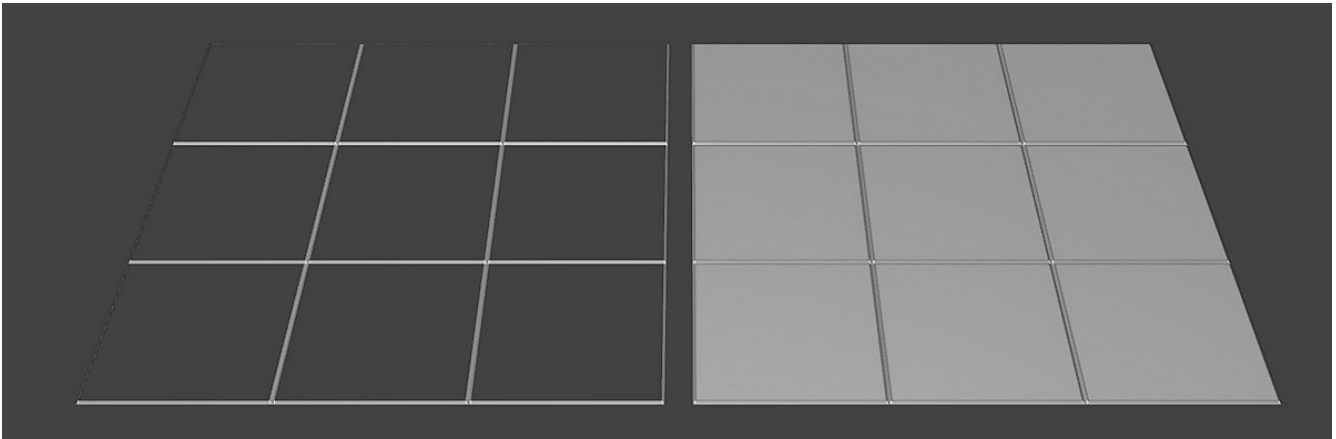
Clip Center	<p>Clips vertices using a merge distance from axis centers when a mirror modifier has been inherited from the source mesh. This also removes clipped faces which results from extrusions in that area.</p> <p>(Minimal impact on speed)</p>
Clip Distance	<p>The distance from which to clip verts to the activated mirror axis from.</p>
Dissolve Edges	<p>This dissolves edges based on an angle threshold. It's basically another form of decimation tool but instead of triangles it creates quads/ngons by removing edges and verts depending on the face angle.</p> <p>This will produce ngon faces for some panel islands but will make it easier to manually push/pull them. If turned off, the islands will retain their quad structures but will have the resolution based on the subdivision cuts you used.</p> <p>(Minimal impact on speed)</p>

The Random Panels operator can go beyond its intended functionality and produce results which can be used for other workflows like creating buildings, extruded details to you can then manually edit to affect the big shape profile of the source model, UI designs by using the Clear Faces: Outer option etc. With some footwork, you can even use this to create alien alphabets/hieroglyphs.



*Figure 11 - Face selection pattern, width and height effects*

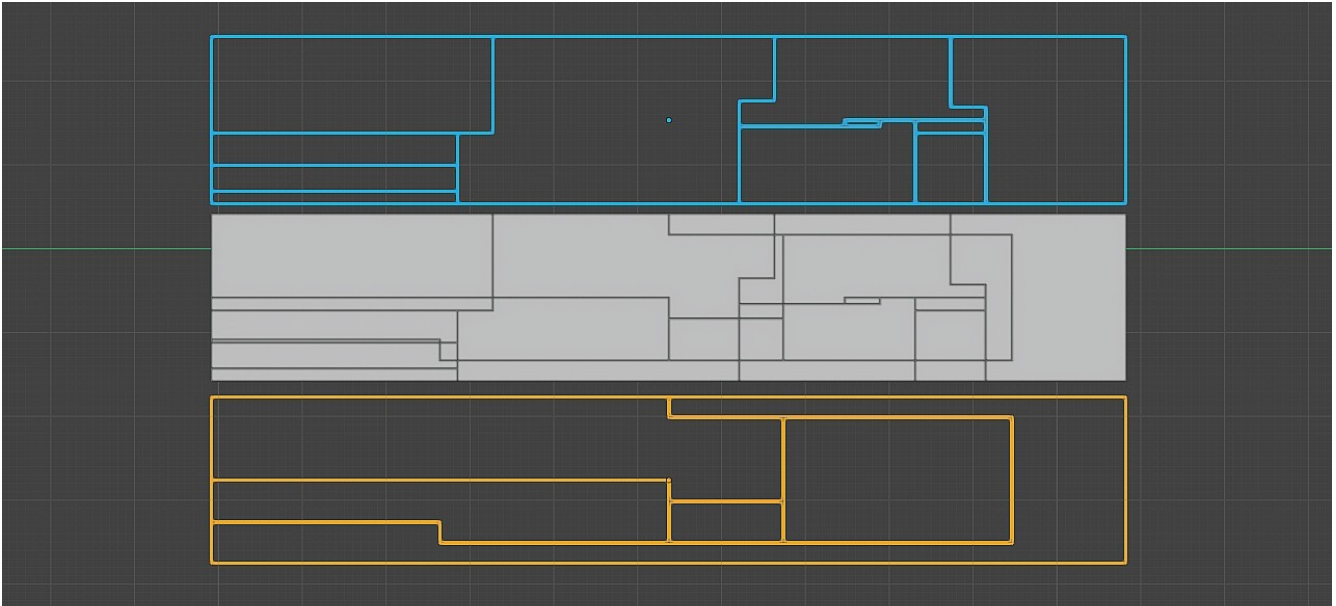
To reiterate, the result of the randomization is greatly influenced by the selected face pattern. In Figure 8, you can see the faces used below and the result above. Smaller and tighter areas tend to create finer details since the islands can be compressed in them. Using too much thickness in smaller shapes can result to distortion so watch out for these.



*Figure 12 - Result of Clear Faces: Inner*

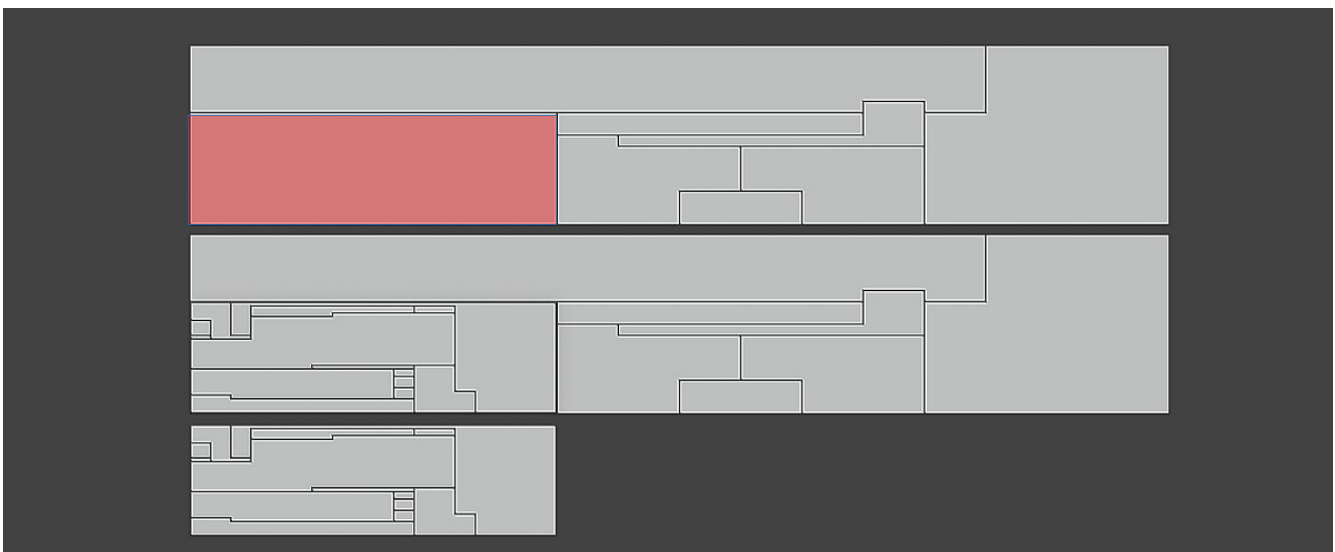
Figure 9 shows the result of Clear Faces: Inner. This only keeps the faces in the split edge area producing a floater mesh detail effect. This is a render trick to fool the viewer that the detail is actually part of the main model and not a separate object – mainly used to avoid changing the main model's topology. This effect can be baked into

the normal map. While this method can produce overlaps in cut off edges, as long as they share the same material it wouldn't be noticeable in renders.



*Figure 13 - Layering of panel details using only the split faces*

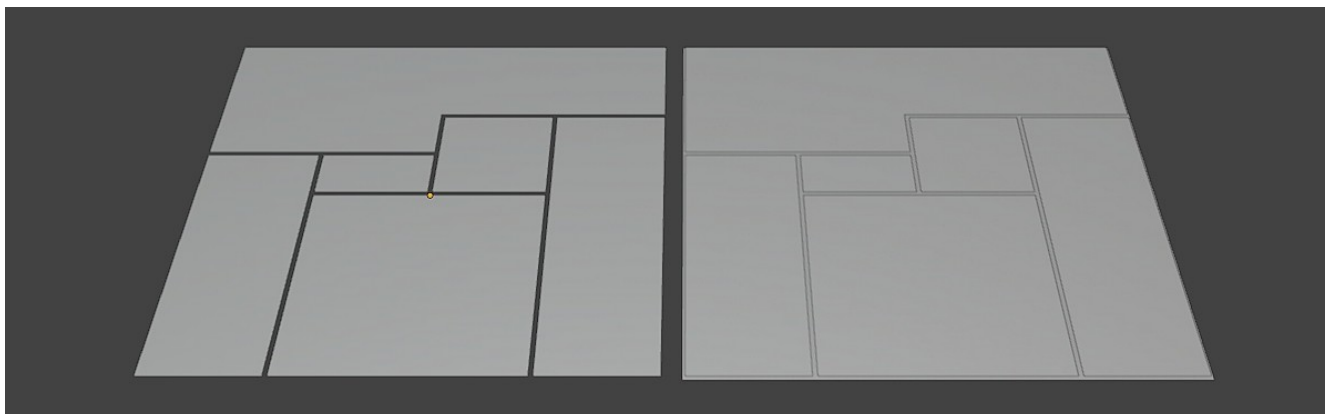
You can also use this method to layer the panel details using different subdivision cuts each time. Figure 10 shows two panel objects used to create the effect in the middle.



*Figure 14 - Layering of panel details using normal parameters*

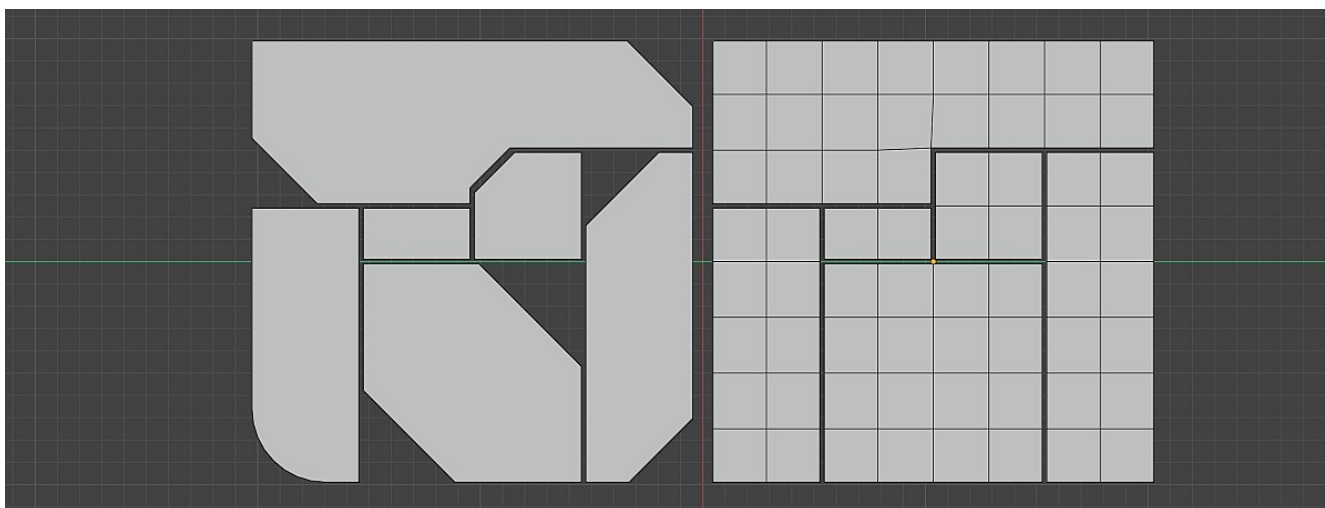
Without clearing any faces or using the normal randomization options, you can layer panel details by selecting the top faces of a panel island and using Random Panels on that area. Figure 11 shows

the final result in the middle, the first layer on top with the highlighted are used to produce the second layer in the bottom.



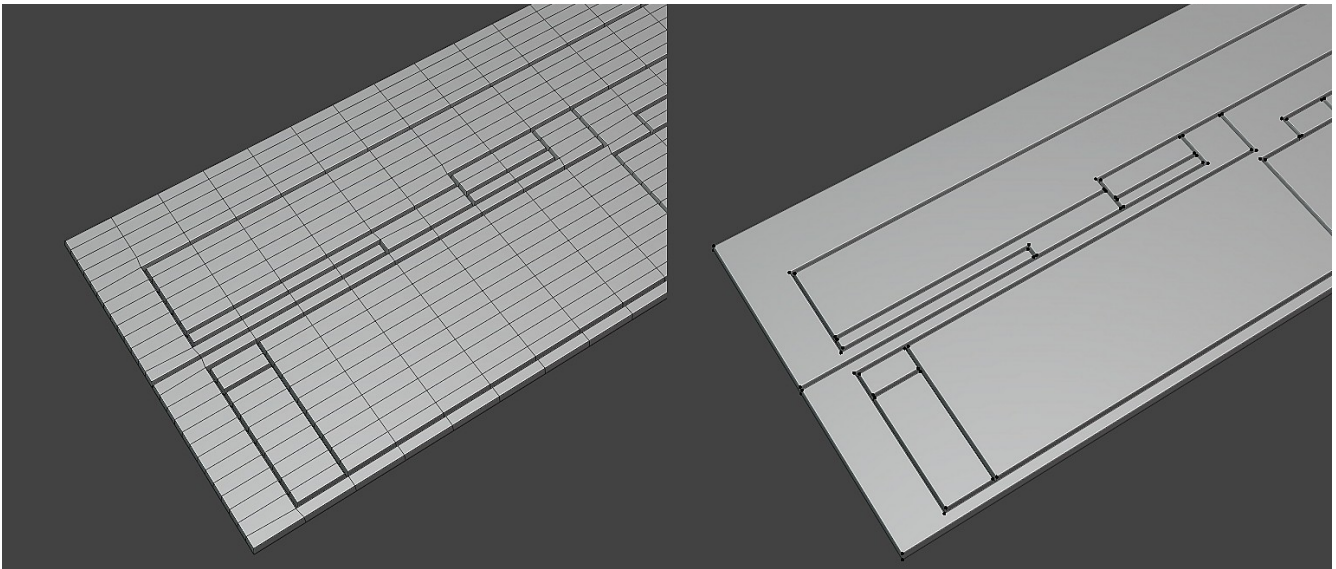
*Figure 15 - Result of Clear Faces: Outer*

The above image is the result of Clear Faces: Outer. This time the split edge area faces are removed and the inner faces are kept. This produces flat planes with offset from the source mesh depending on the depth value. This can be used for different things like decal effects, glowing UI elements on a screen etc. I leave it to your imagination to invent the rest as you use this.



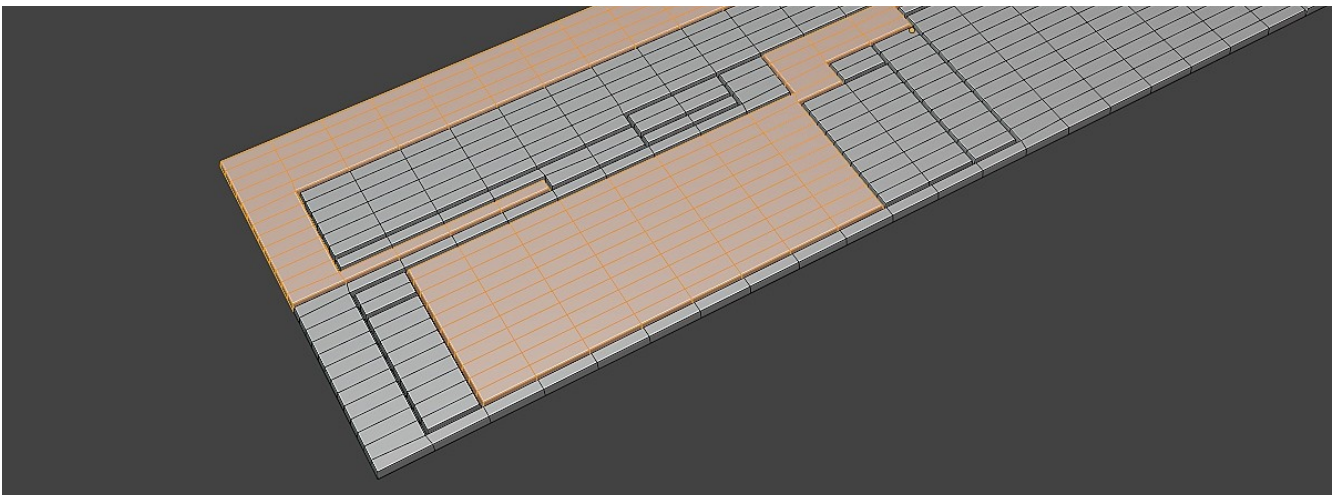
*Figure 16 - Beveling corner verts from Clear Faces: Outer*

Alternatively, you can also limit dissolve the faces which will produce ngon faces but will make easier to bevel the corner verts of the panel islands to any offset or width. You can choose to solidify the faces after using Ctrl+F > (S) Solidify. Limit Dissolve can also be done manually apart from using the operator parameter by selecting all the faces and pressing X > (L) Limited Dissolve.



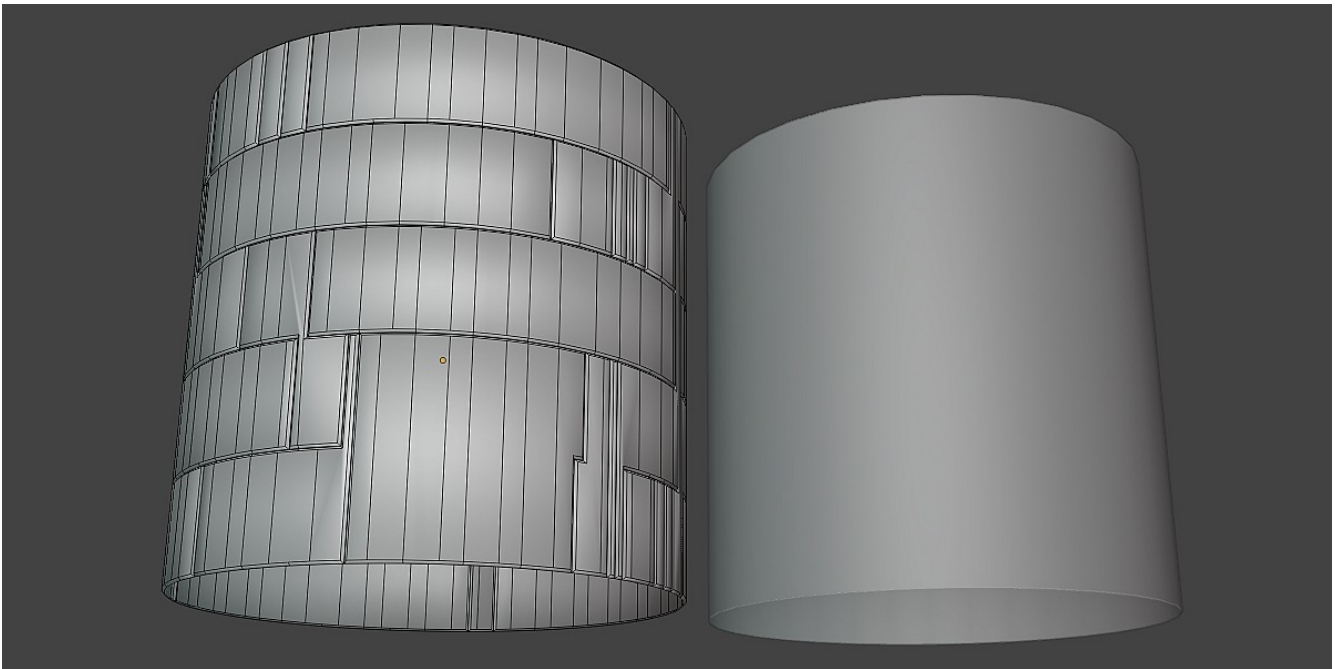
*Figure 17 - Panel topology with subdivision and limited dissolve*

You can see the result of using limited dissolve on the right. While this produces ngons, it makes it easier to select the top faces of the panel islands if you want to push or pull them by using the hotkey Alt+S. But to use Random Panels again on that area, the ngon face must be quadified again – which the operator Quad Slice can make short work of. If quadded either manually or using Quad Slice, you lose the even distribution of quads in the left picture. It's up to you to decide what action to take, clear the subdivision cuts to lower the overall resolution of the scene and make edit mode transforms easier or keep it.



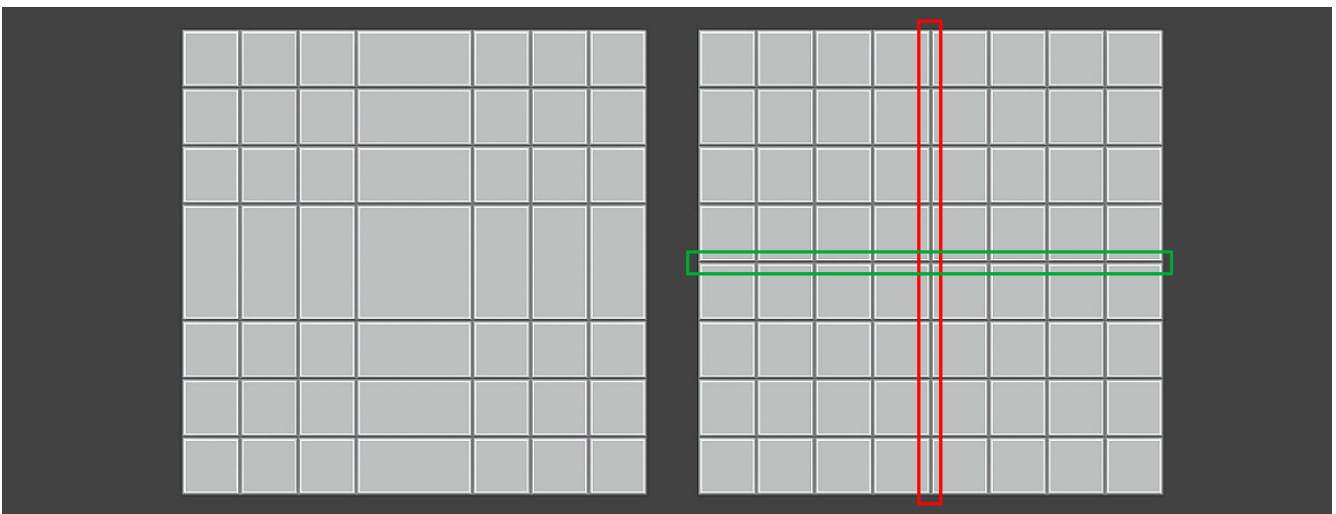
*Figure 18 - Face selection using the cell or island structure*

The face islands are separate from each other so you can also use the L hotkey to select individual islands to isolate or remove them.



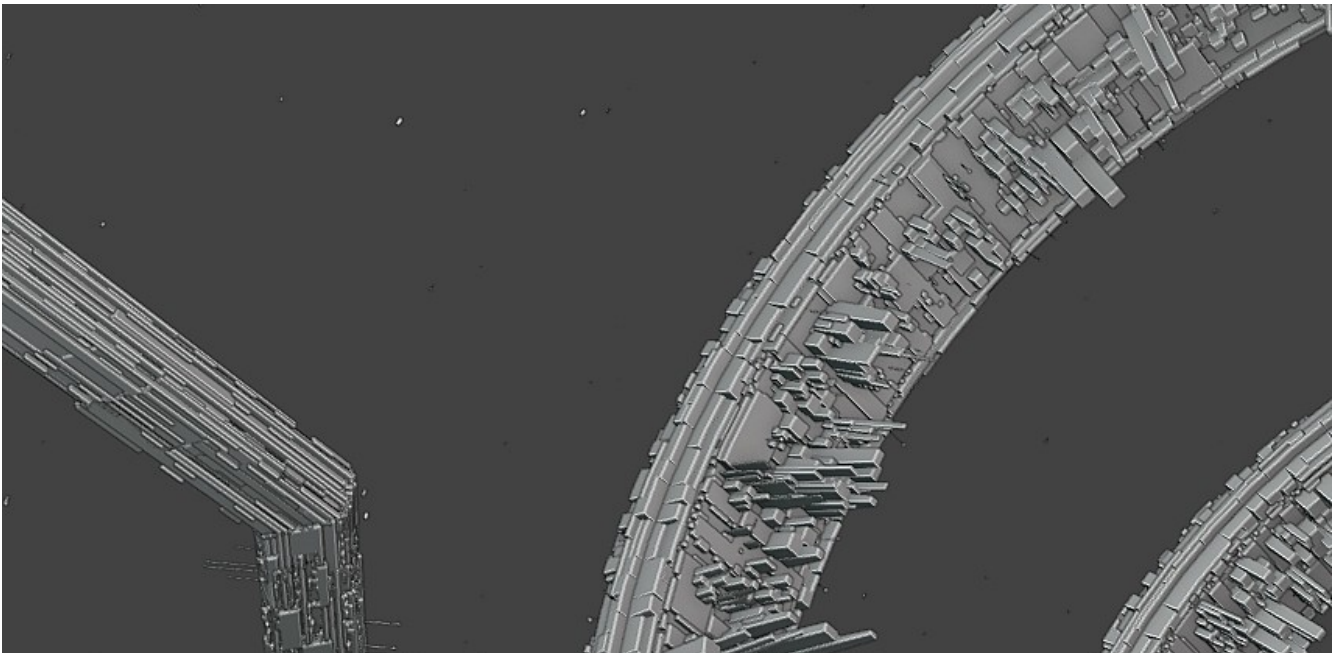
*Figure 19 - Limited dissolve on curved surfaces*

Do not use limited dissolve on curved surfaces as this can remove important supporting edges keeping the curvature in place. This will result in shading distortions as the faces lose these edges.



*Figure 20 - Getting rid of split details in mirror center axis*

Figure 17 shows the effect of Clip Center as it clips or merges the vertices closest to the mirror center axes. This is useful for getting rid of the cut detail in the middle parts when the randomized object inherits the mirror modifier from the source mesh. This also gets rid of the inner faces in those areas like in Figure 6 in Random Extrude.



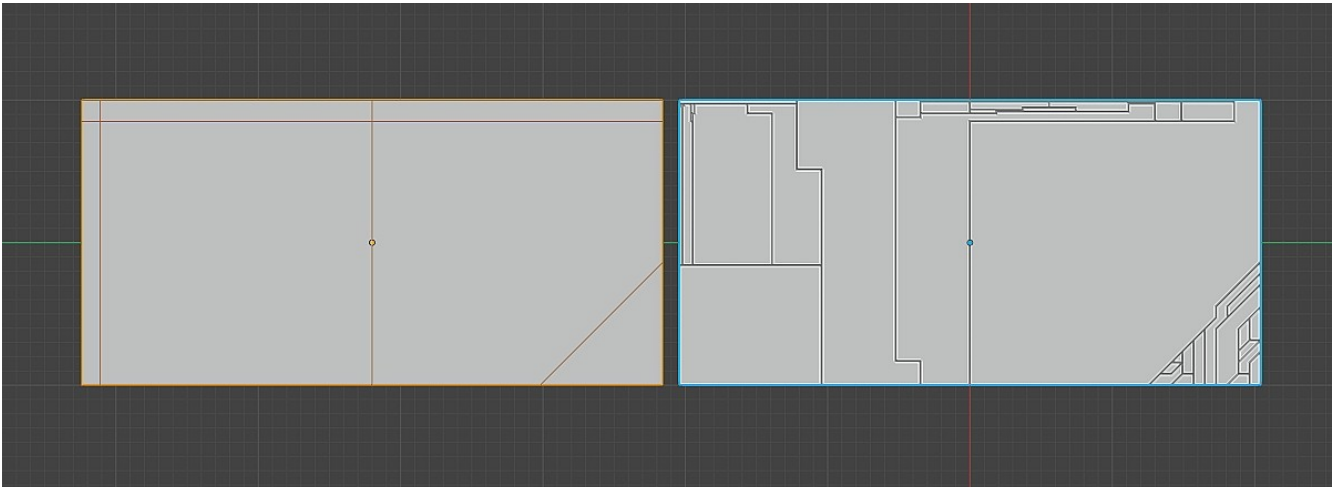
*Figure 21 - Building structures and layered shapes*

You can try increasing the height value to get details beyond just paneling. In the image above, I used it to create protrusions that looked like buildings. There are many things you can do with just this operator and Random Extrude. Combine them in layers to get even more interesting shapes. Don't forget to go in and manually add more shapes in the random objects as well as the source objects as you work as this will provide the most satisfying outcome.

Some parameters in the plugin like the height in Random Panels only operate when you increase the value past 0.0. This is because modifying the vert positions can influence speed especially in higher subdivision.

Use the cells from the panels to stack up panel details or random extrusions and remember to only use the top faces and not the side faces. You can also use faces from the random extrusions for paneling or random extrusions again.

Before we move on to the next operator, remember that the face selection affects the result of randomization? Also their width and length plays a big factor to that too. Some areas with more face resolution can hog up the panel islands to themselves and leave the more relaxed surfaces with less details so watch out for this.



*Figure 22 - Panel islands on different face width and height*

In Figure 22, you can see the cut details get bunched up on tighter areas. You can use this effect to your advantage but remember this behavior because sometimes you might not be aware that you selected some smaller area faces. How could this happen? Dealing with quadification using the processes involved in this plugin can sometimes result to “almost zero area” faces which you’d only notice if you zoom in. These faces can wreak havoc with the results of randomizations especially with Random Tubes.

Also in the image above, you can see the tri (can be subdivided by Blender code) are using up most of the islands. This is because the island generation code is mostly optimal on quad faces. To avoid this type of thing, you can work on the triangle separately using lower subdivision.

## RANDOM SCATTER

The Random Scatter operator scatters objects on random surface points from selected faces in the source mesh. This is the only operator in the add-on (*currently*) that doesn't rely on subdivision to increase points or verts to use for randomization. The speed factor has less to do with the source mesh resolution but rather the objects you are trying to scatter.

Hold on. Can't geometry nodes already do this? Geometry nodes is magic but when I was considering this operator I thought about how much time you'd set up geo nodes just to get the effect you'd have with Random Scatter – normal orientation, explode feature, margin and correct collection object origin to placement every time. Sure you can set up geo nodes for this and append it in any scene you are working on but the speed the Random Scatter operator offers when iterating shapes and design is something that can't be ignored. The only caveat is that geo nodes is modular whereas the operator deals with a static result.

### Undo Parameters

Parameter	Function
Type	Options: Cube, Mesh, *Collection.  This determines the objects you want to scatter. You can choose between a primitive cube, a mesh object from the scene or a collection of objects.  The Collection option is not available in the Lite version.
Mesh	Search bar to search for mesh/object in the scene to use as scatter points when using Type: Mesh.
* Collection	Search bar to search for collections in the scene to use as scatter points when using

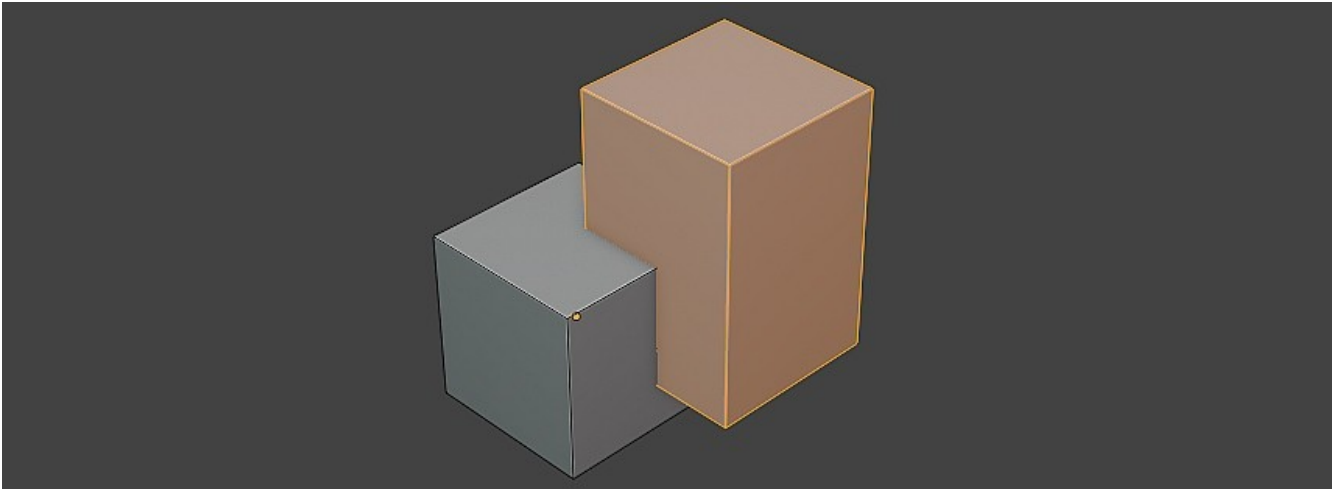
	Type: Collection.
* Object Seed	Seed value for a fixed randomized result of the point distribution of meshes/objects from the collection.
Points	The number of points you want to scatter. Each of these points will have the scatter object in its location.
Point Seed	Seed value for a fixed randomized result of the distribution of points.
Scatter Size	<p>Minimum and maximum size of the scatter object.</p> <p>The Scatter Scale parameter will scale the objects after this value.</p>
Size Seed	Seed value for a fixed randomized result of the scatter size.
Scatter Scale	Scatter object's scale in the x, y and z axis.
Scale Seed	Seed value for a fixed randomized result of the scatter scale.
Rotation	Rotation of scatter objects in the x, y and z axis relative to face normal.
* Rotation Seed	<p>Seed value for a fixed randomized result for the x, y and z axis rotation of the scatter object.</p> <p>This is a little different from all the seed parameters in the plugin. The value of 1 doesn't really seed the randomization instead going past this value does. This is to give the user an option to keep uniform rotation for all scatter objects.</p>

	If you use 180° rotation for example, then the minimum rotation for randomization will be -180° and vice versa.
* Explode	Moves the scatter objects away from the faces using a direction based on the face's normal. This has a minimum and maximum value setting. For parameters like this, setting the minimum value higher than the maximum value will make it work instead as the maximum one.
* Explode Seed	Seed value for a fixed randomized result for the explode distance.
Margin	Moves the scatter objects closer to the center of the face their scatter points are located or has been generated.
Material Index	Lets you assign materials from the source mesh to the loop objects. At default value of -1, it will use the source mesh's active material if it exists. Going past this value, you are using material assignment per index. 0 means the fist material in the material stack and 1 is the next one.

Again, the speed factor in Random Scatter is greatly affected by the resolution of the scatter objects and less so from that of the source mesh. This is because the points generated are done by script rather than actual subdivision of the selected faces.

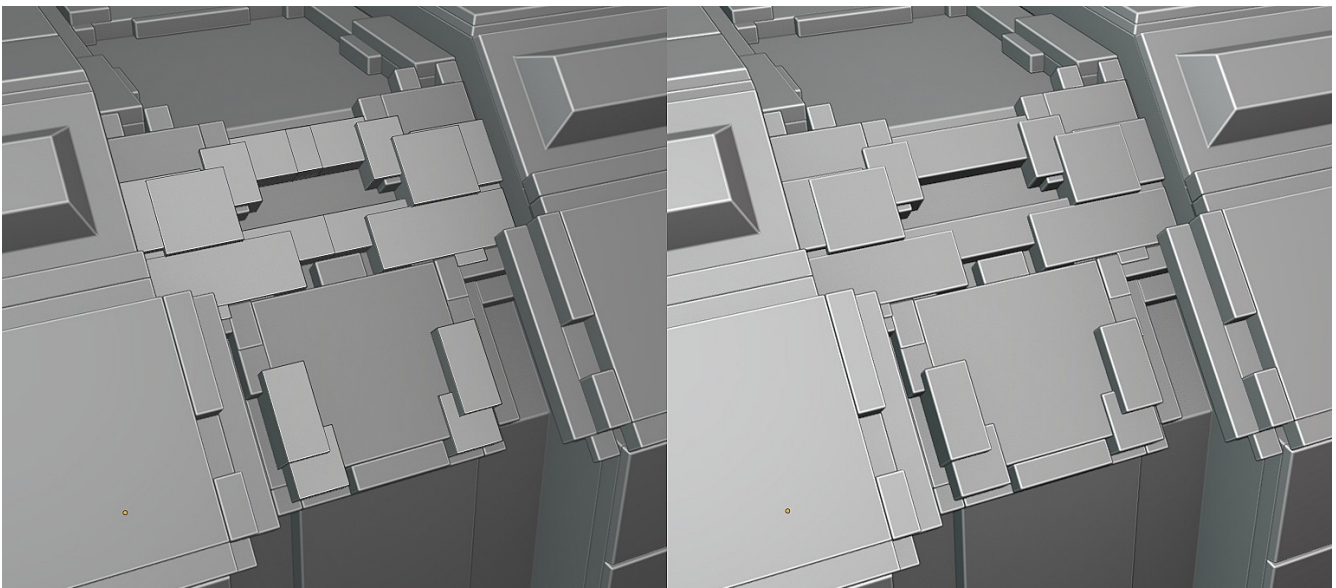
Then again as for all the operators in this plugin, resolution from the source mesh will ultimately affect this operator's performance just not that much at the onset.

The scatter object can be used for purposes like creating angular noise detail on some empty spaces in the design. This is besides what I first imagined what it should do, distribute pointy things in spaceships. Or building structures like Random Panels, although face penetrations can happen this can provide more “noise” than random panels.



*Figure 23 - Face penetration at its most erotic moment*

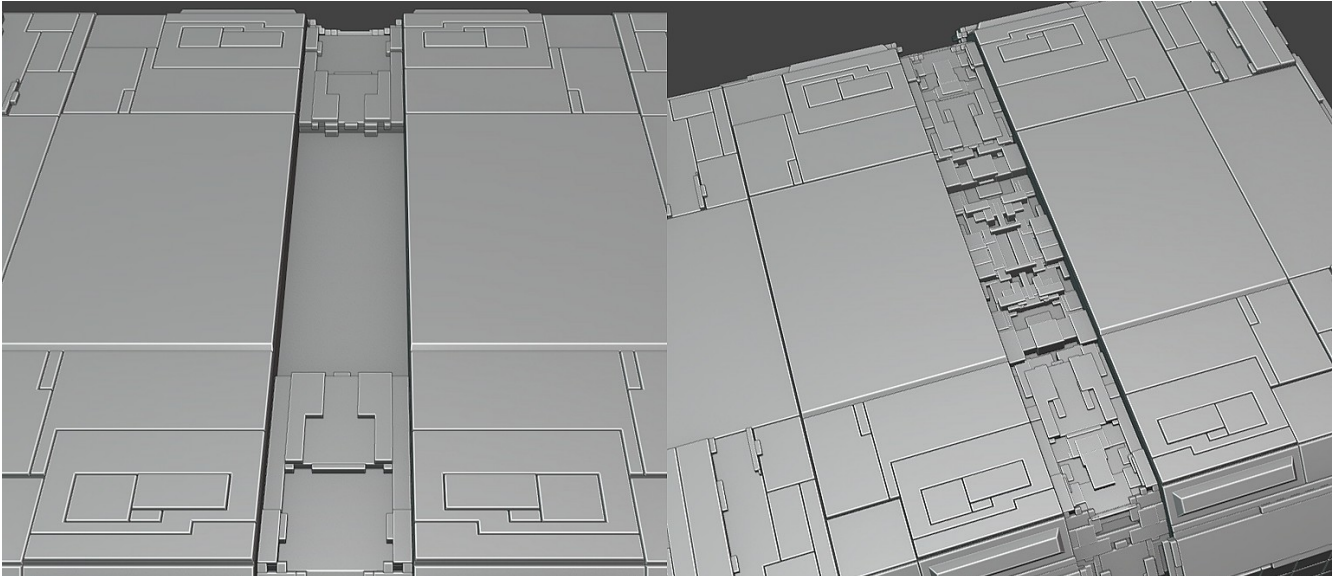
Face penetrations? Basically just a solid set of faces with some of its faces penetrating or overlapping another solid set of faces.



*Figure 24 - Creating angular noise detail on some small spaces*

Figure 24 shows a particular use for the Type: Cube scatter object in case you're wondering why it's there. And apart from using Random

Extrude to add angular noise details, you can also use Random Scatter for this effect.



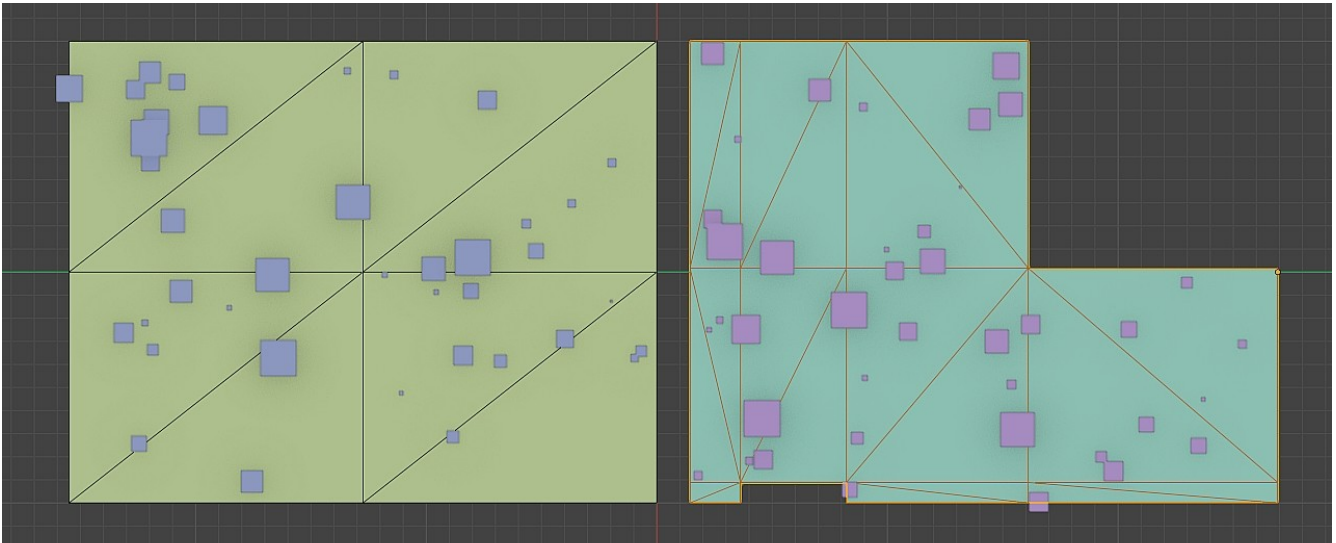
*Figure 25 - Scatter objects on empty valleys*

Figure 25 shows a more extreme example for this method. In the left picture, I selected faces from the empty space and scattered cube shapes playing with the point, seed, size, scale parameters until I get the details I want. This is useful for filling in valleys in the design but you can certainly use it for more outer faces if you want.



*Figure 26 - Small scatter objects on relaxed areas*

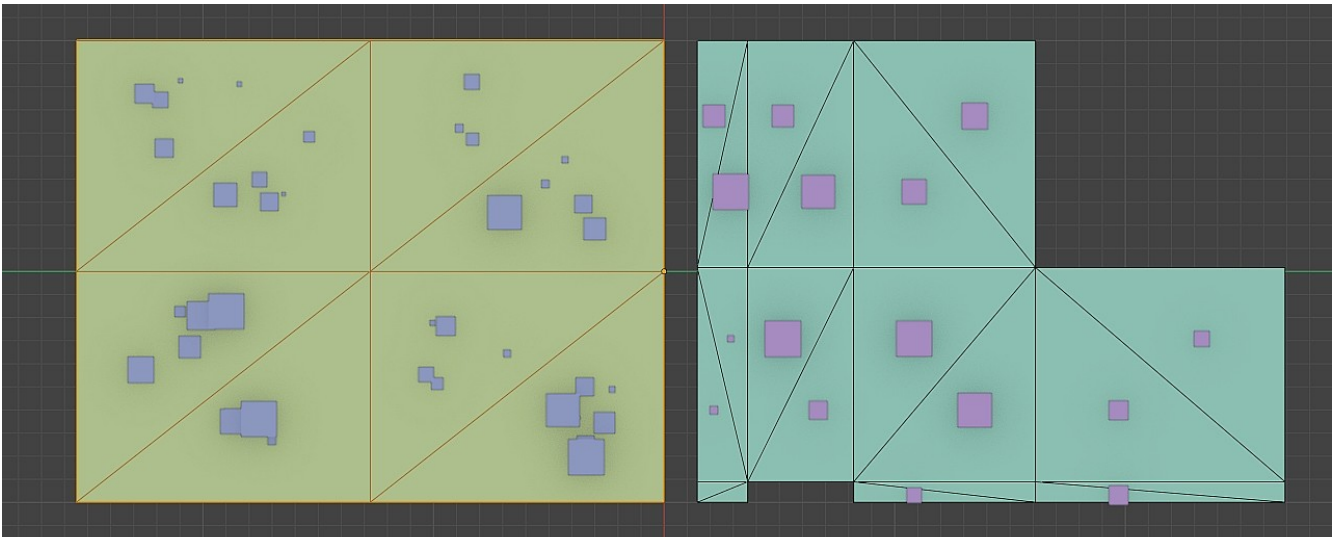
You can also use this to distribute small shapes on relaxed areas to just to break up the surface a bit. Of course, you can instead use the mesh type to scatter designs like simple rivets instead of the cube.



*Figure 27 - Inner workings of point distribution*

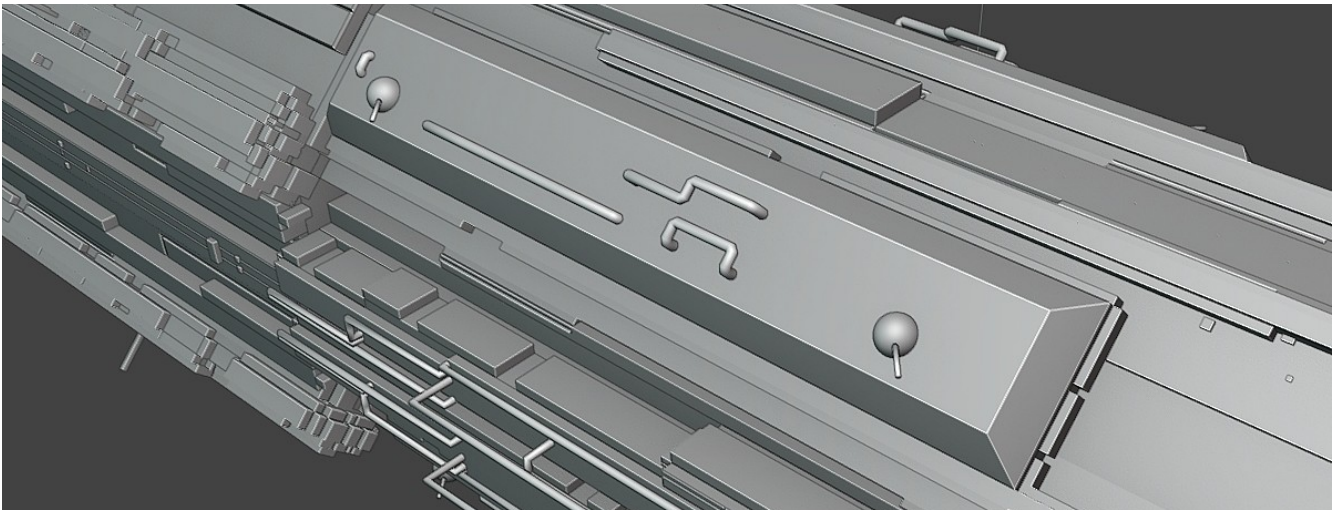
In Figure 27, you can see how the script distributes the points. The selected faces are triangulated (even *ngons*) to provide the script with the proper a, b, c locations to come up with an area to distribute the points.

Why are you showing me this? It's important because parameters like the margin depends on this system for its result. This will also inform your decisions when trying to select different faces to be used for distribution.



*Figure 28 - Margin gravitates scatter object to tri center*

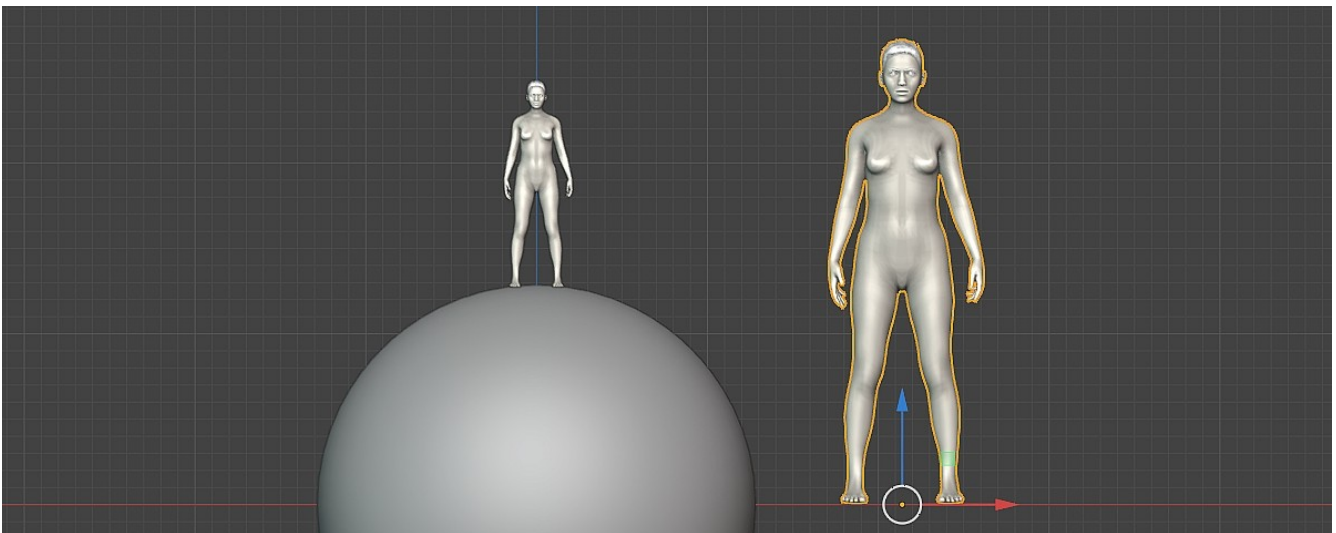
In Figure 28, you can see the faces gather towards the center of the triangles when increasing the margin until at last they become bunched up to a single point in the right side of the image.



*Figure 29 - Simple turret design as scatter object*

Figure 27 shows my first attempts at testing manually modeled scatter objects using the mesh type. I selected certain faces from the randomized objects on the ship and used that to distribute the turret objects using the operator.

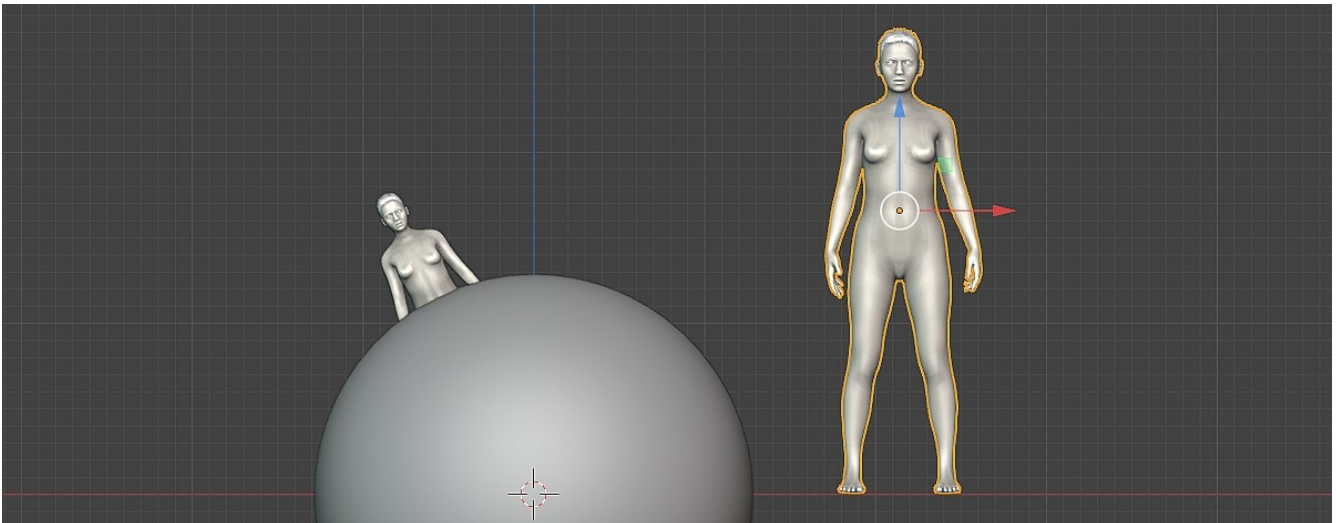
"I've been using Random Scatter and I just can't place it on that perfect spot! It's been days, man!". Remember, it's a random process, placing objects on those perfect spots can be like winning a small lottery contest using the seed values. If it's just one or two object you need to place perfectly, do it manually.



*Figure 30 - Orientation and origin of scatter objects*

The operator will align the objects using its local Z up orientation on the face normal of the point generated. Figure 28 also shows how the mesh will be placed vertically or how far in or out relative to the face

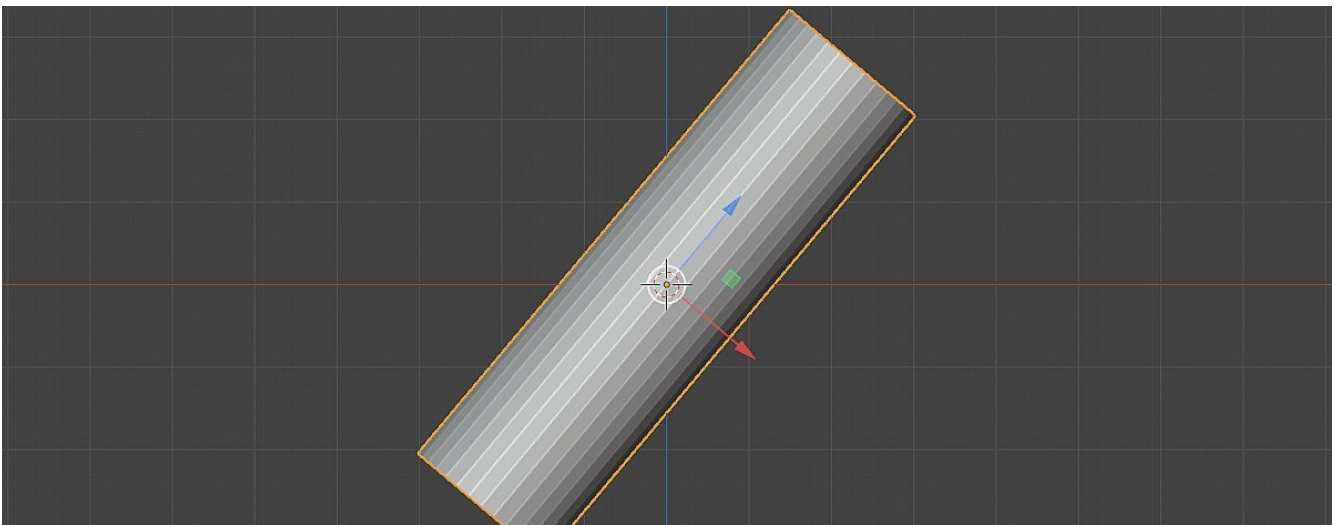
where the point is. This is dependent on the location of the origin in the mesh. You can see that she has hers at her feet so in the left side of the image, you can see her feet touching the surface of the sphere.



*Figure 31 - Orientation and origin affects placement*

Figure 29 shows the result if the origin is moved to her belly button. I rotated the sphere to demonstrate the normal orientation from her Z up position and also how far she's placed vertically using her origin point relative the surface point.

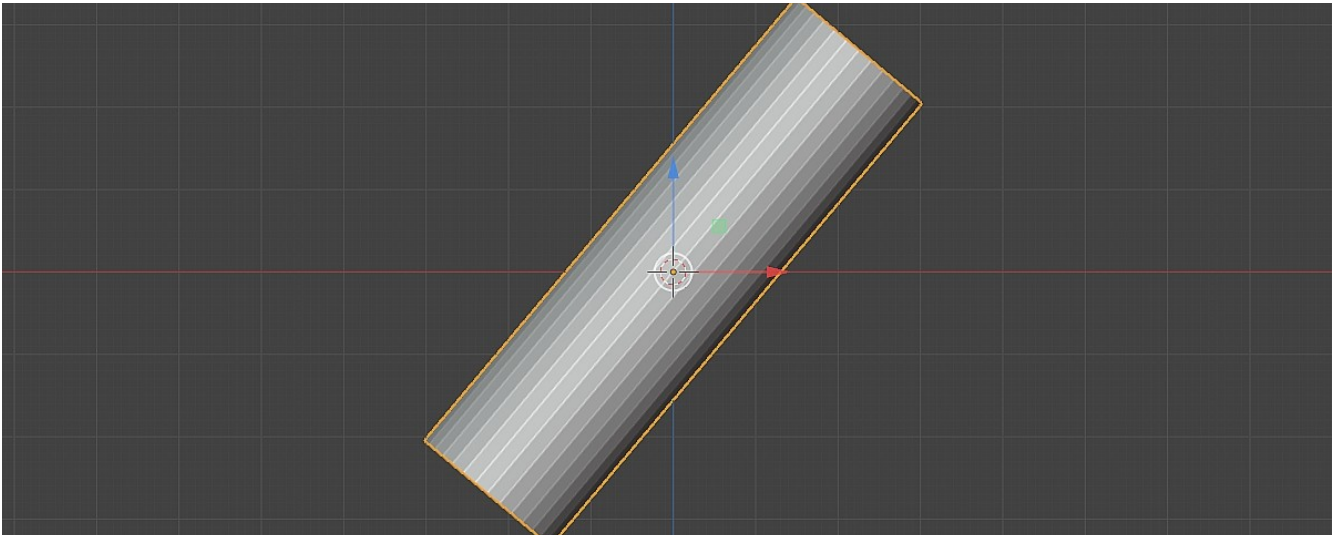
Remember this when trying to model objects as scatter points. The orientation is not with the object lying down or from the sides or front and back but standing up using its local Z axis.



*Figure 32 - An object's local Z axis*

Local Z axis means the z axis of the object or mesh in local space or its own space. You can see in Figure 30, with the cylinder rotated the

3d widget also rotates with it, this is showing its local space or matrix. If you apply the rotation, then the widget will normalize to the global space or matrix.



*Figure 33 - Object rotation applied*

You can see this change in Figure 31 as the 3d widget (*showing the alignment of the local axis*) now aligns to the global axis. Now if you use this as a scatter object, the placement will be lopsided especially with this particular shape and the randomization in scale and size that happens.

*(Also in Figure 28 and 29, the human figure is only used as an example. Do not use this type of mesh with such high resolution as scatter points because Blender can freeze.)*

And that was the most important synopsis for this operator, the rest is self-explanatory. While my original concept for this operator is to distribute pointy extrusions in sci-fi models to break its profile, it can certainly be used for other things like angular noise, buildings, circuit structures etc. You can even use this on a mirrored cube, elongate it a bit, distribute scatter points then voxel remesh (modifier) the result to create random spaceships with enough interest in their shape profile that you can use as faraway background objects. Again, lots of application if you just experiment with it and combine it with other functionalities.

## RANDOM TUBES

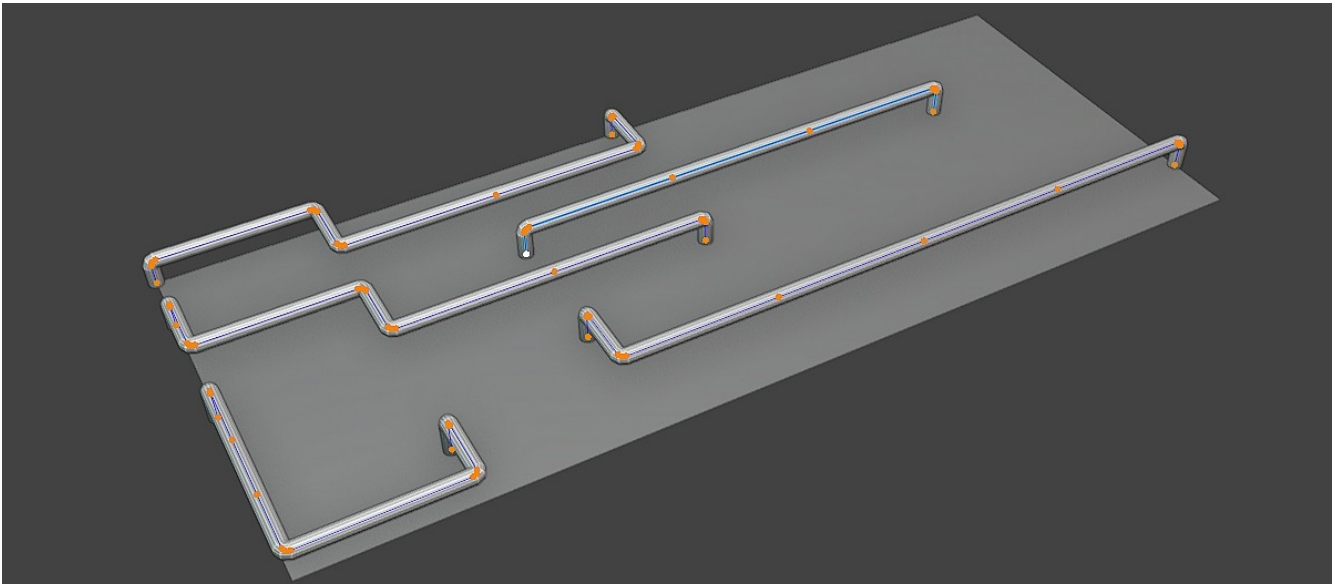
The Random Tubes operator distributes random tube like shapes using the selected faces from the mesh. Like Random Extrude and Random Panels, its result depends on subdivision to provide it with more points to operate but this time instead of creating face islands like the previous two, the path generated comes from edges.

This can also be used for some effects like wire details, organic noise and creating handle shapes you can convert to mesh and further model.

### Undo Parameters

Parameter	Function
* Solver	Options: None, Shortest, Longest. Determines which edge lengths to favor when walking edges to create the tube. None will use all edges.
Amount	Number of tubes to generate. This sometimes will not give exact results as it depends on the amount of points available and the length of the tube to generate can rob the rest of the tubes of the necessary points to manifest themselves.
Length	The amount of edges needed to create the tube.
Seed	Seed value for the fixed randomized result for the tube distribution.
Offset	Minimum and maximum offset of the tubes. This determines how much the body of the tube pushes out from the surface.
Offset Seed	Seed value for the fixed randomized result

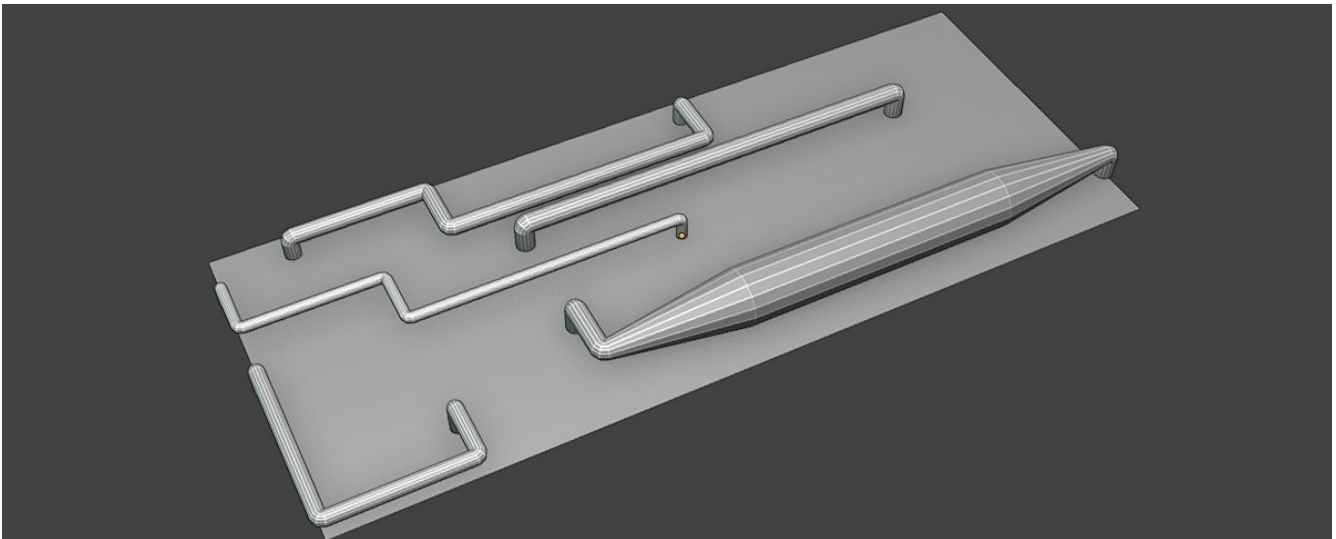
	for the tube offset.
Margin	Determines the margin from the selected face's boundary edges.
Curve Depth	The radius or thickness of the tube.
Curve Resolution	The resolution of the tube.
Bevel Width	The bevel width or offset of the tube points.
Bevel Segments	The resolution of the bevel width/offset.
* Angle Limit	Bevels points in the tube instance based on angle limit. The default 30° works for most sharp angles.  This works at static 30° in the lite version.
Subdivision Cuts	This refers to the subdivision of the selected faces to provide additional points for the tube instances to work with. Also affects point/vertex resolution of the tubes.
Subdivision Smooth	Subdivision smoothing. Useful for some curved face selection.
Material Index	Lets you assign materials from the source mesh to the loop objects. At default value of -1, it will use the source mesh's active material if it exists. Going past this value, you are using material assignment per index. 0 means the fist material in the material stack and 1 is the next one.
Shade Smooth	Shades smooth the tube instances or randomized curve object.



*Figure 34 - Curve type object*

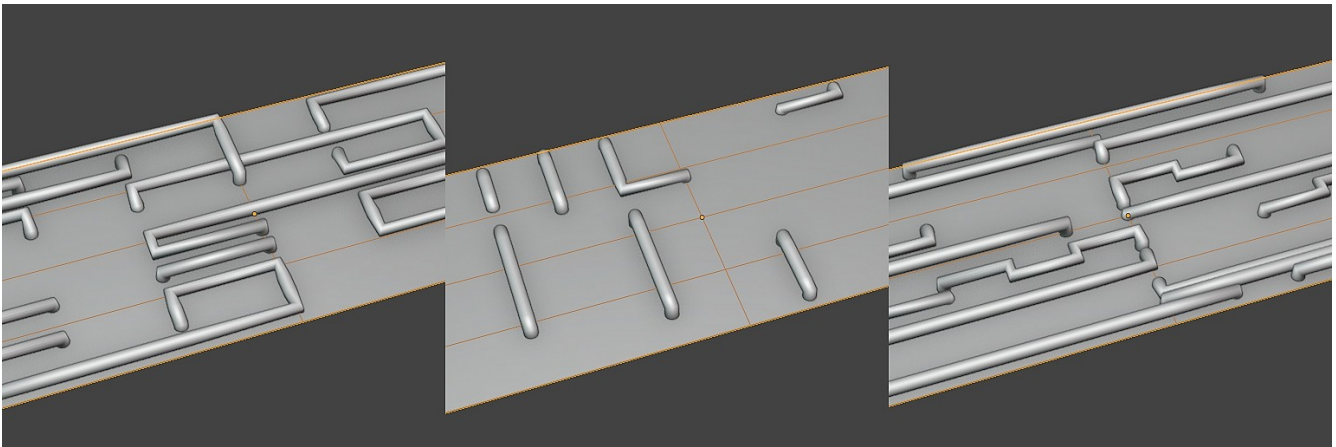
The random object generated from the Scatter Tubes operator is a curve object. The script works on this as a mesh before converting it to a curve.

Why a curve object? Because it's easier to transform in edit mode by just picking segments instead of faces and edges.



*Figure 35 - Increasing curve radius in edit mode*

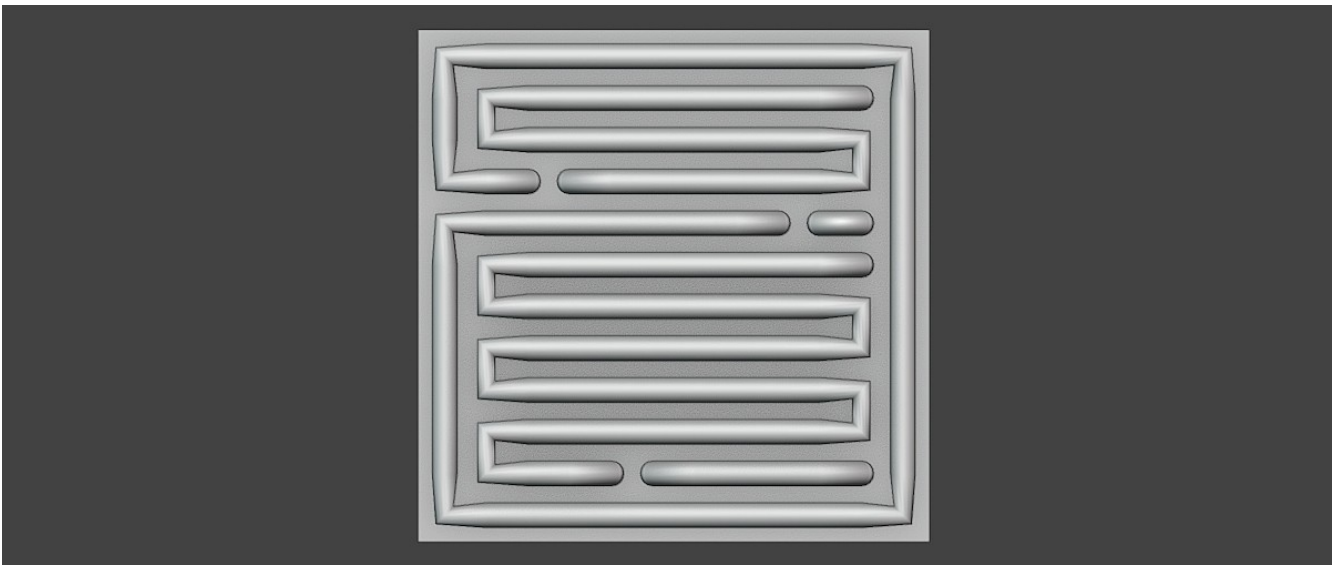
You also use the hotkey Alt+S on segments to increase the radius of their geometry. By hovering on a segment and using the L hotkey you can select a whole tube instance. Again this cell structure makes it easier to isolate, remove and separate randomized elements from the operator results.



*Figure 36 - None, Shortest and Longest edge length solvers*

Figure 36 shows the result of the length solver on a particular topology. Left image is using the None length solver which favors no edge lengths making the tubes coil everywhere, the middle image is using the Shortest length solver which makes the tubes use the shorter edges more and the right image is using the Longest edge solve which makes the tubes favor the longest edges more while generating the tube instances.

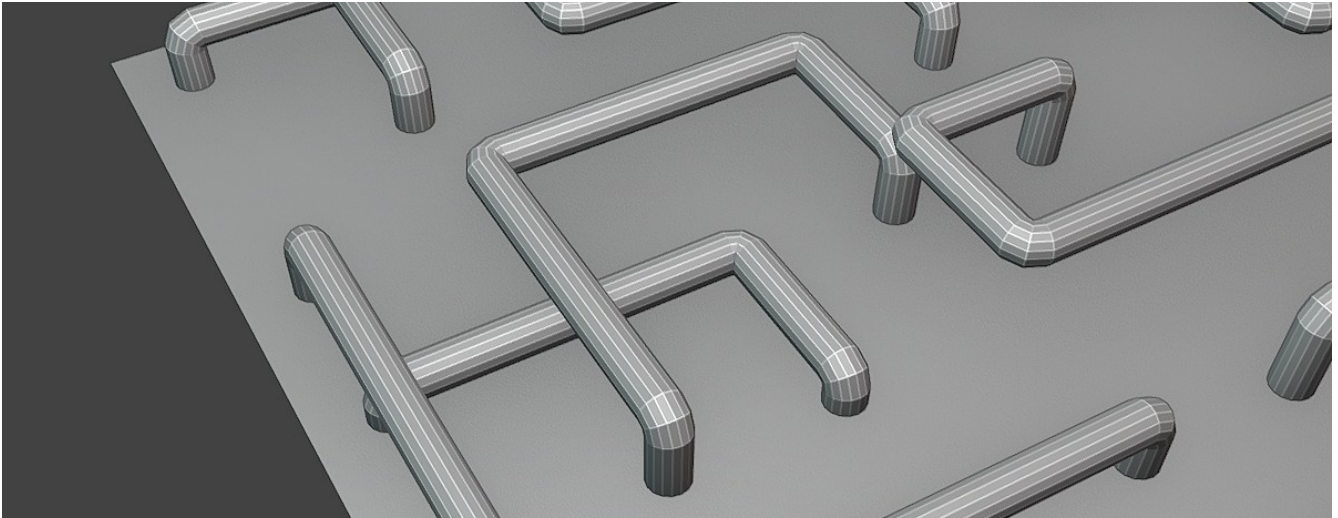
The solver creates a variation in tube shape generation based on the topology, length and width of the face selection while also granting more control instead of letting the tubes just snake their way on every direction.



*Figure 37 - Coiling pattern/behavior*

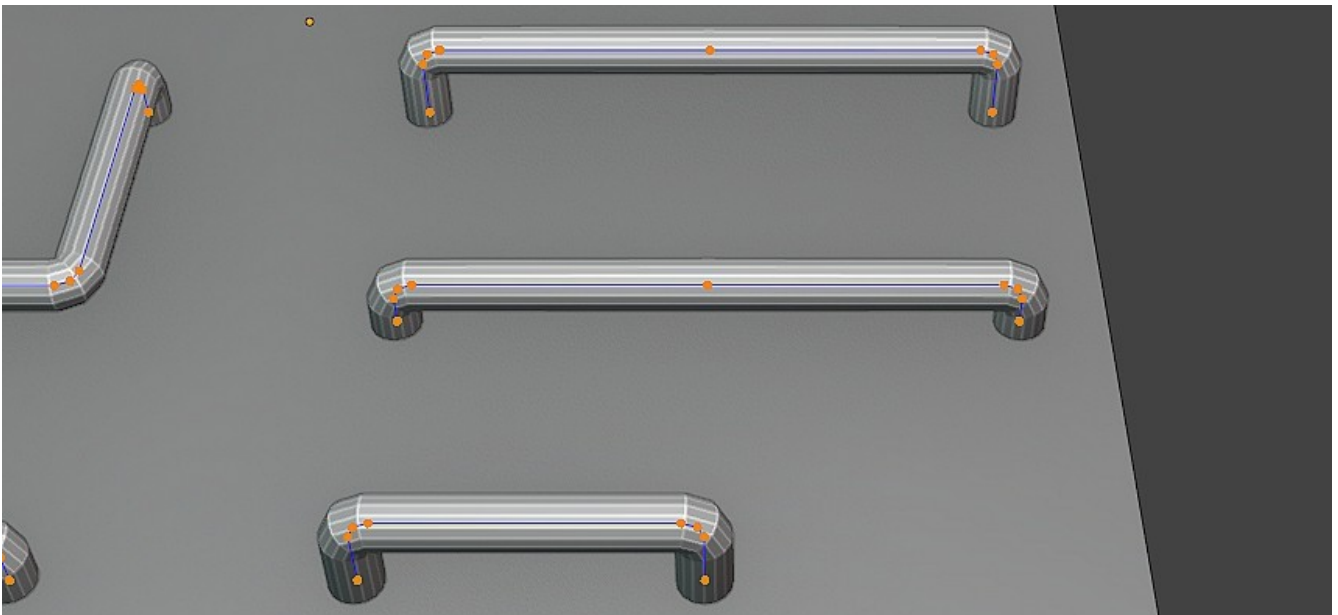
While coiling around the tube will avoid hitting its head, body and tail.

Other tubes will also avoid generating their heads and tails on other tube's head and tail. But they can cross or walk between the body points of other tubes and even create their heads and tails in those areas.



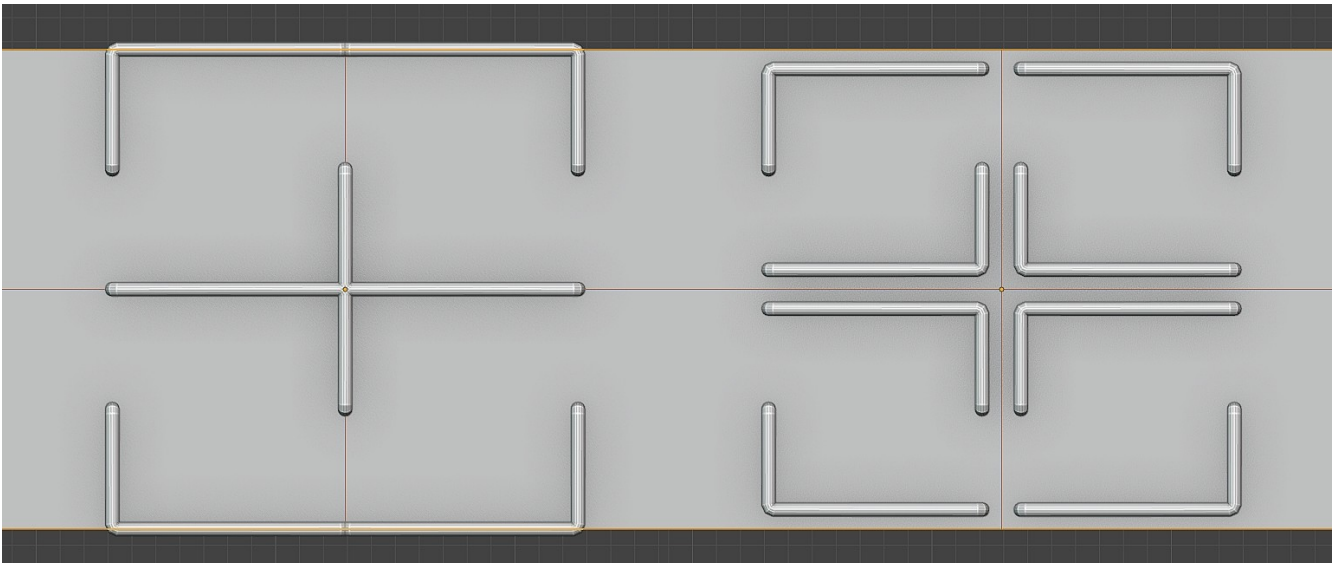
*Figure 38 - Overlap points*

These can create overlaps but you can avoid this by modifying the offset value and seed to add height differences between the tube objects.



*Figure 39 - Minimum tube length*

Despite the length minimum being 1, the script will gravitate more on creating 2 edge tube instances if possible. This is to avoid making too much small scale tubes per subdivision level.



*Figure 40 - Margin parameter*

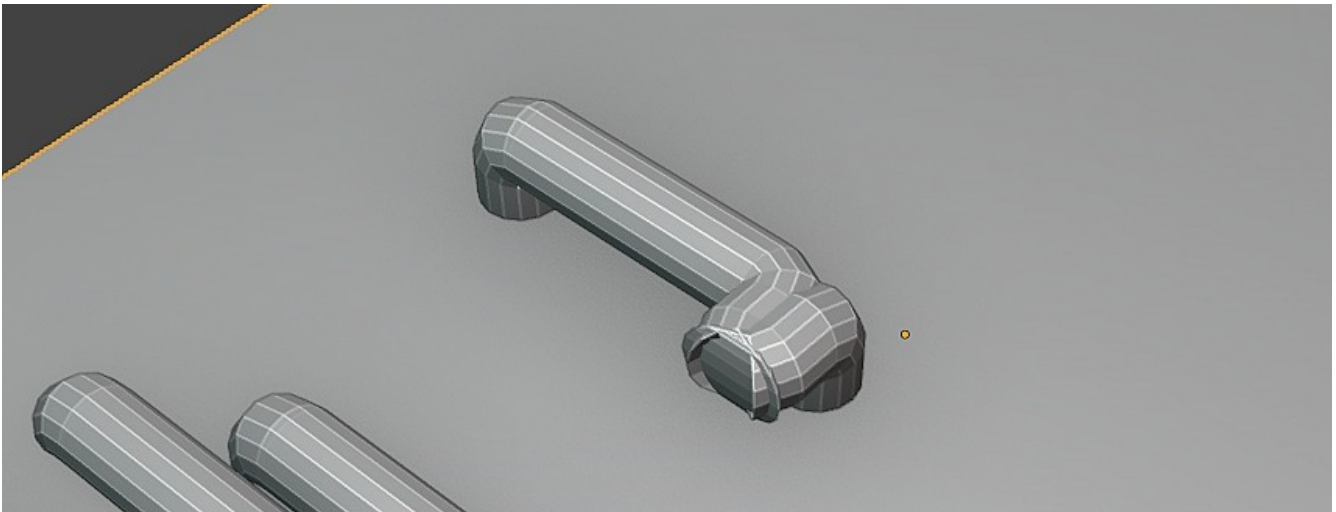
The margin parameter is useful when the random object inherits the mirror modifier from the source mesh. You can see in the left side of the image that the tubes can be created from the non-manifold edges present in the mirror center axis. By increasing the margin, the points are separated from these areas avoiding overlap problems later on if you decide to convert the curve object to mesh.

Be careful using too much margin value on tight areas since that can cause distortion in the tube body.

The margin parameter will not work if no boundary or non-manifold edge is present from the face selection. This can happen by selecting a solid set of faces or the whole default cube.

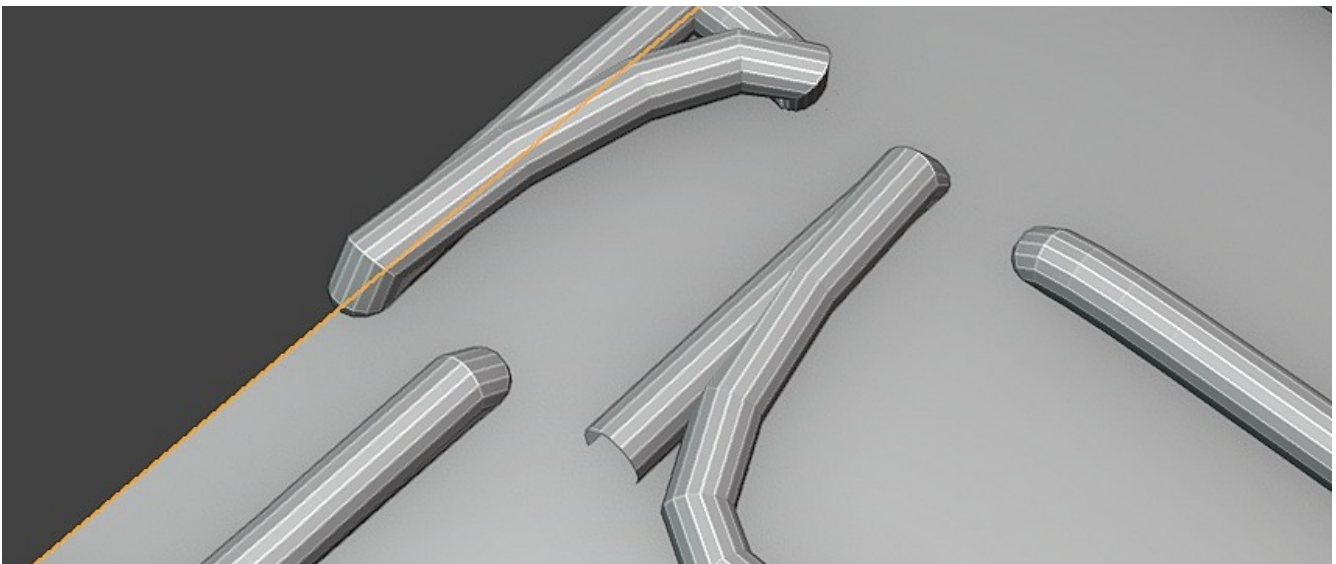
Although, even if the face selection doesn't have a boundary edge from the original mesh, there still will be since the rest of the faces apart from the selection will be deleted. This does not happen if the selection is the entire object. Having a mirror modifier splitting the mesh automatically creates non-manifold edges in the center axis.

*(Putting a mirror modifier on an object doesn't split the mesh. You can use the vanilla add-on Auto Mirror to do this – can split at multiple axis using multiple applications. Using Ice Tool Pro's Reset Mirror can split the mesh at multiple axis in a single operation. If you have other add-ons that can achieve this effect, use that also.)*



*Figure 41 - Geometric distortions*

For some topology, especially if the face selection used involves thin faces upping the subdivision will make them narrower even more. Since the script uses the edges from that to make the tubes, using certain curve depth and bevel width can cause overlaps in areas where the tube instances turn. To remedy this, just decrease both values until the geometric distortions are gone.



*Figure 42 - Too much bevel offset*

Also, I didn't put in clamping in beveling but using too much offset can cause overlaps and distortions like the image above. Again, be aware of the settings you've put in always not just in this operator but for all of them.

# SUPPLEMENTAL OPERATORS

The following are supporting functionalities for the randomization process and randomized objects.

## AUTO SMOOTH

Shades smooth the faces of the mesh based on an angle threshold (*default of 30°*). Edges that do not meet the angle threshold become sharp. Useful for hard surface when you want the relaxed areas smooth shaded and the angular regions flat shaded.

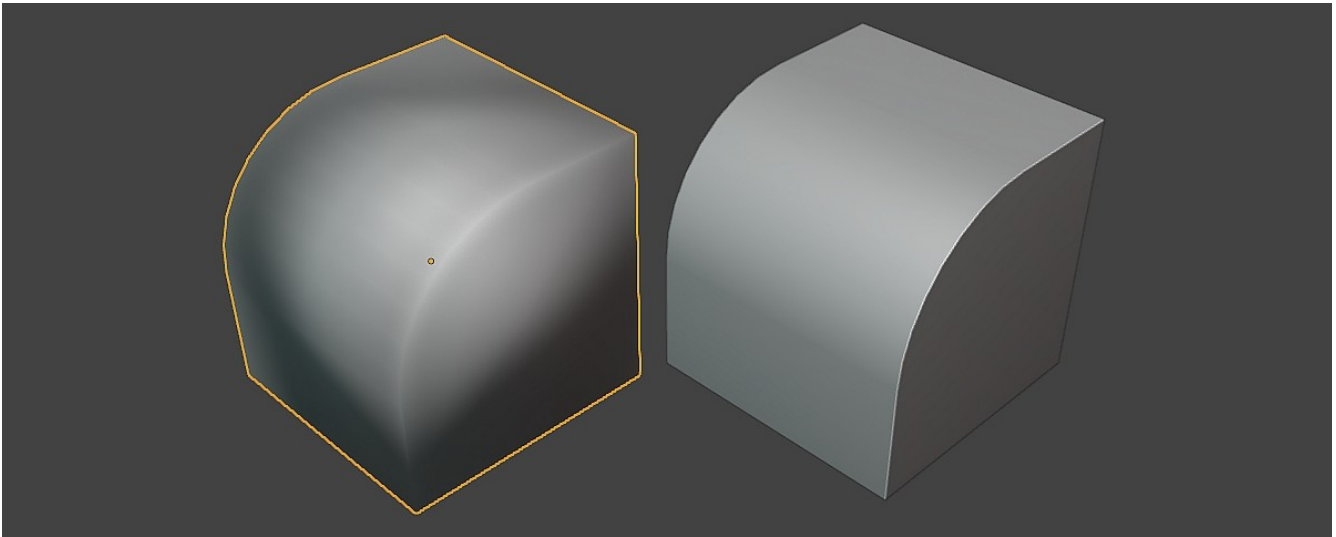


Figure 43 - Smooth shading vs Auto Smooth

The image above shows the difference between an object using just the normal smooth shading (*left*) and with auto smooth (*right*).

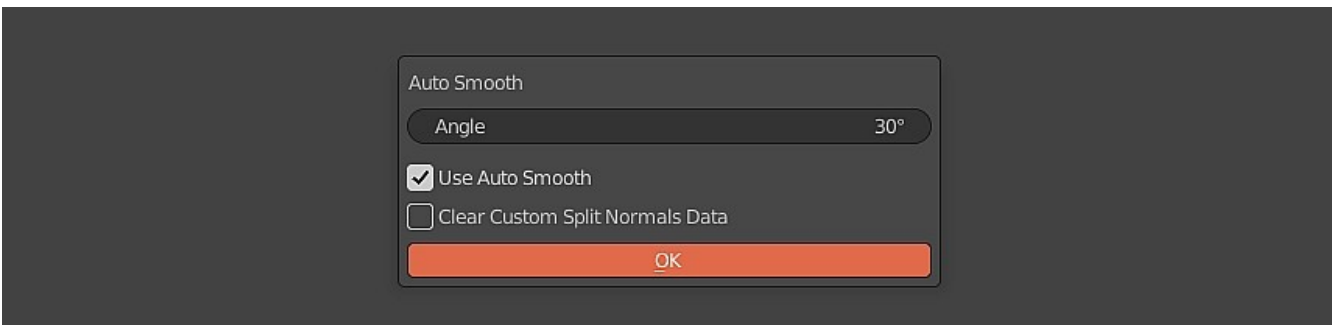


Figure 44 - Auto Smooth undo menu

If you press ctrl plus the operator button it will show you the undo menu instead of operating instantly.

In the undo menu, you can find the Angle Threshold parameter, Use Auto Smooth and Clear Custom SplitNormals Data.

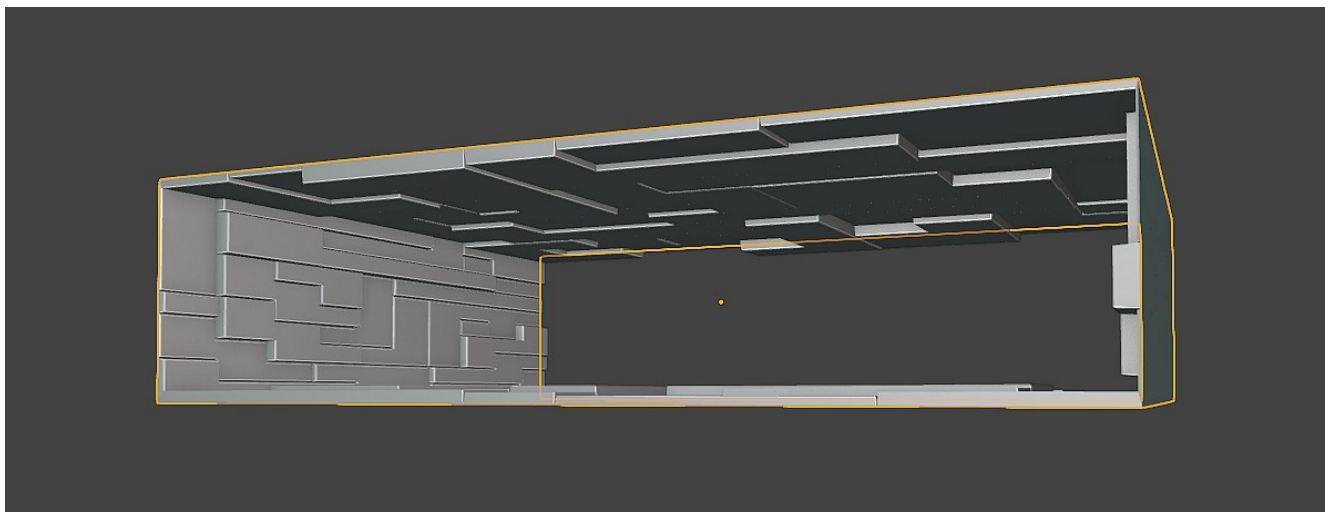
You can toggle off Use Auto Smooth if you want to remove its effect setting the mesh back to flat shading.

The Clear Custom SplitNormals Data is used when the object/mesh previously had split normals data and is causing shading errors in the faces particularly in edit mode. This will probably not happen when working with Random Flow alone but the Creative Bundle uses a lot of modifiers like Data Transfer, Edge Split and script works to assign all bunch of data to the mesh so this option is mostly useful there.

Also this operator comes from CB and works the same way. The only difference is that the one in Random Flow will work on multiple objects selected in object mode.

If you have flipped normals, this is not that “SplitNormals” thing. Instead use the hotkey Alt+N in edit mode for selected faces to flip, recalculate inside or outside their normals.

Can I use this normal flipping somehow?



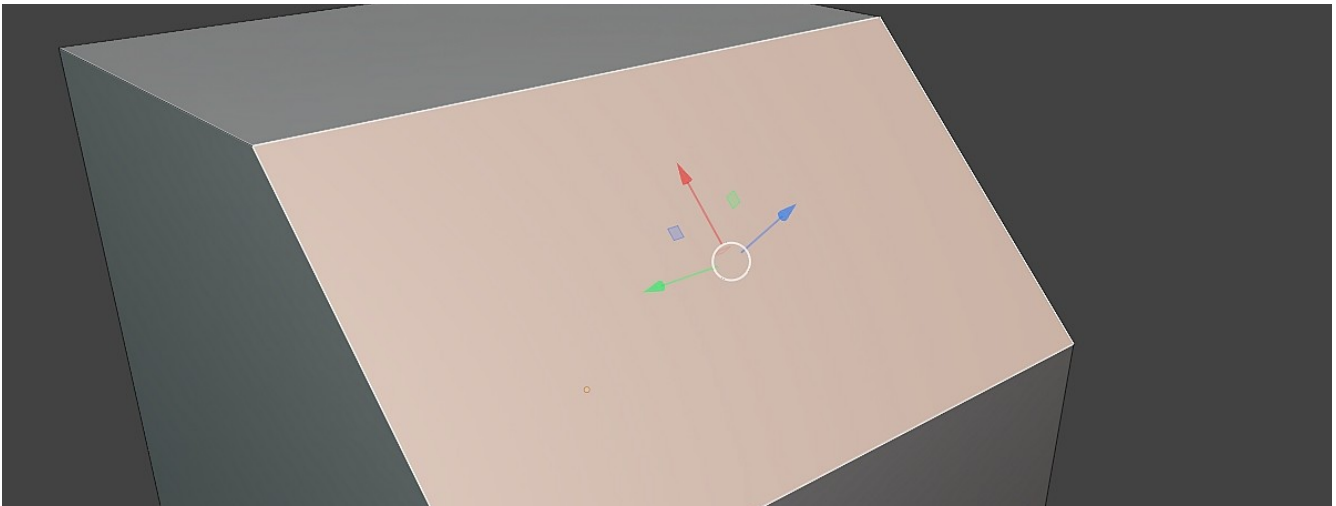
*Figure 45 - Flipped normals*

In the image above, the normals of the faces were flipped so the random panels generate inside instead of the outside space.

## QUAD SLICE

The \*Quad Slice operator only appears in the menu in edit mode. This is not available in the lite version but is also in Cuber in CB which is basically the same operator.

Its main function is to quadify planar ngon faces by shooting cutter lines from vertices or edges in the x, y axis on the normal plane. What the what now? I know, but it's simpler than it reads.

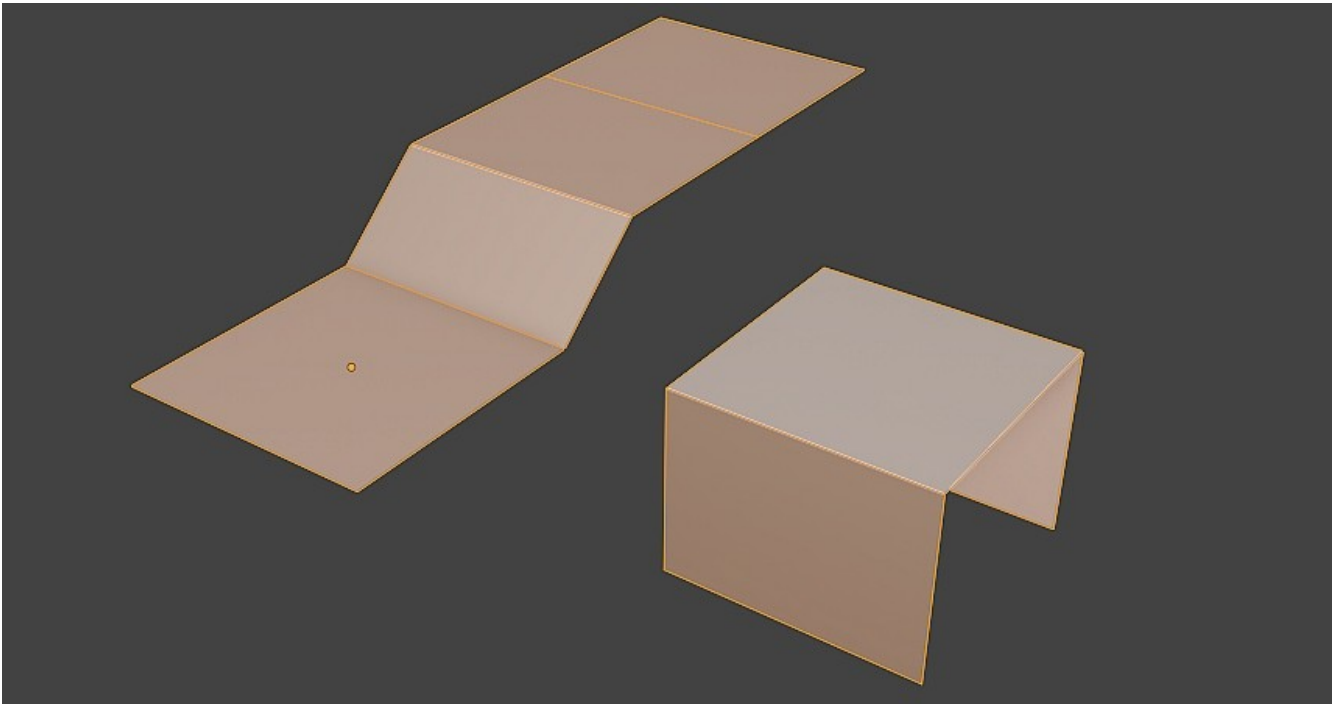


*Figure 46 - The normal direction*

"In geometry, a normal is a vector or a line that's perpendicular to a surface or an object". See the axis widget in the image above? That's the normal or normal direction of the selected face.

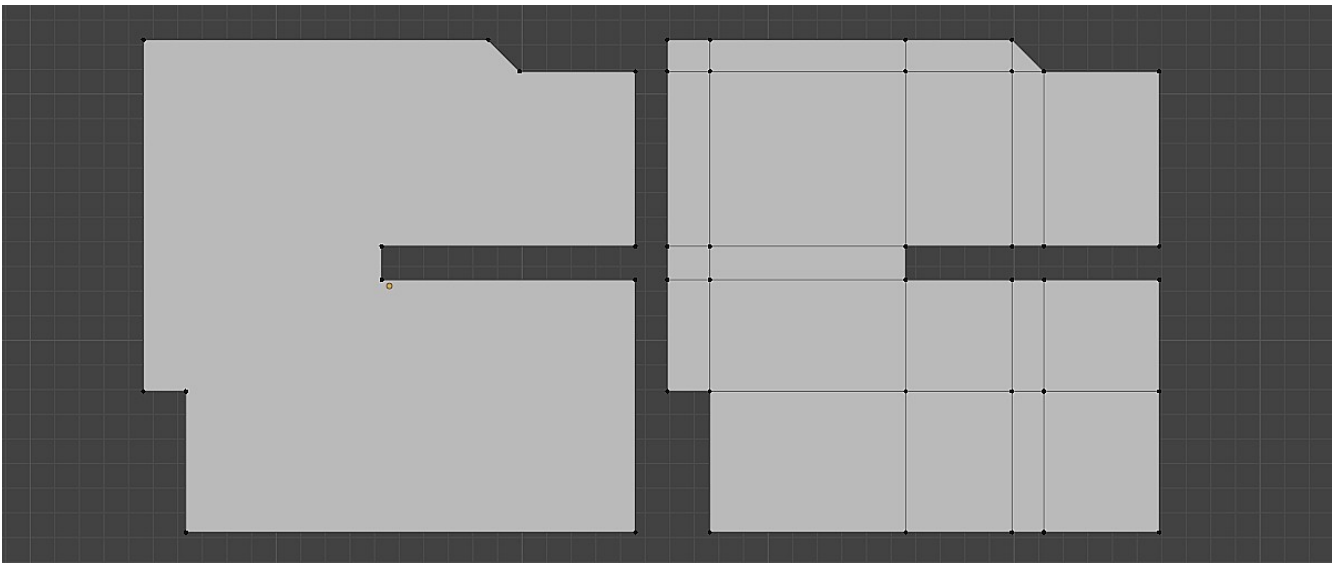
In 3d widget world, the colors R,G,B is equals to X,Y,Z. In Figure 46, do you see the Z axis pointing up from the face? That will be our normal plane or up direction. Our birds eye view when looking at the face as a Cartesian plane. Now, the X and Y axis will be the directions the selected verts and edges will be shooting lines from and cutting everything in their path and in the process create quad faces in ngons.

This sounds promising! Can I maybe use this to quadify the entire object? Yes. But only on limited face selections and those selections must be in the same plane. This is not designed for whole mesh selection.



*Figure 47 - Planar selections*

In Figure 47, the upper left face selections basically lie in the same plane and the bottom right face selections do not as some of the faces are turning away in sharp angles. It will still work on the bottom right example but for documentation sake let's focus only on the planar selections.



*Figure 48 - Cut originating from selected verts*

Figure 48 shows how the ngon face (*left*) becomes quadified (*right*) with the selected vertices shooting line cuts in the x, y direction on the normal plane.

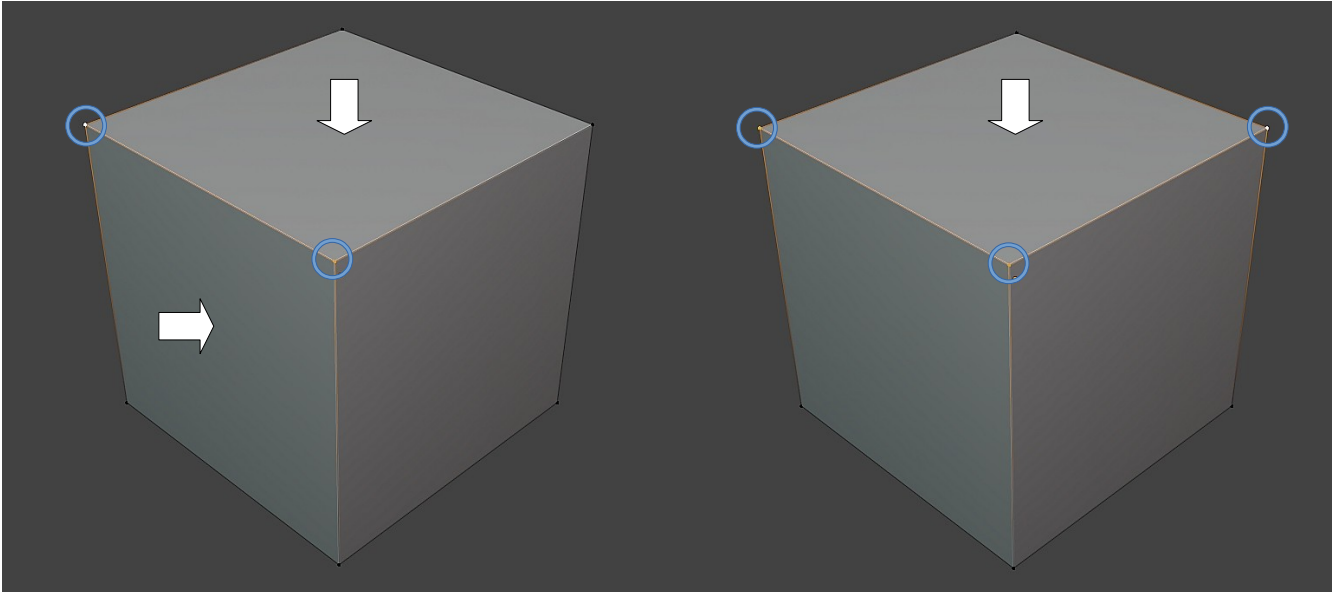
## Undo Parameters

Parameter	Function
Direction	<p>Options: View, Tangent</p> <p>Determines the orientation of the x, y axis to cut to. View will use the viewport camera x and y axis and Tangent will use the tangent edge's direction from the linked faces of the vertices selected.</p>
Tangent	<p>This will show up when you use tangent as direction. It lets you cycle through all the tangent direction sourced from the vert selection.</p> <p>This has a max of 10,000. But that doesn't mean the total tangent sourced is that many. If the amount is only 3, then going past that value say 4 will cycle back to the first tangent, 5 for the second, 6 for the third and 7 for the first again. You get the idea.</p>
Origin	<p>Options: Verts, Edge.</p> <p>Determines where the origin of the cut will be. Using edge you will have the ability to modify the factor or position of the cut along the length of the edges.</p>
Geometry	<p>Options: Selected, All Faces</p> <p>These options will show up when a face is selected.</p> <p>Options: Shared Face, All Faces</p> <p>These options will show up when only verts/edges are selected or if no face is highlighted from all the vert/edge selection.</p>

Face	<p>This shows up when Origin: Verts is used.</p> <p>Lets you cycle to all the shared faces of the selected verts to isolate the cuts on that face.</p> <p>The cycling method works the same way as the Tangent parameter.</p>
Limit	<p>Options: None, X, Y.</p> <p>Limit the cuts to none, the X axis or the Y axis.</p>
Factor	<p>This will show up if you use Origin: Edge.</p> <p>This lets you slide the cuts along the length of the selected edge.</p>
Rotation	Rotates the cut lines in degrees.
Remove Singles	<p>Removes all two edge vertices that can sometimes appear after the operation. TEV's or singles are vertices that only has two connecting edges.</p> <p><i>(Singles is my personal terminology so don't go around Googling this. I thought it was way better than writing Remove TEV's where T can also mean Three. 2EV's?)</i></p>

Besides using the shared face method you can also limit the cut to the selected faces by using the hotkey Shift+H, this will hide the unselected faces isolating the cuts to the visible ones. You can press Alt+H to unhide everything after the operation.

## Shared faces? Tangents?

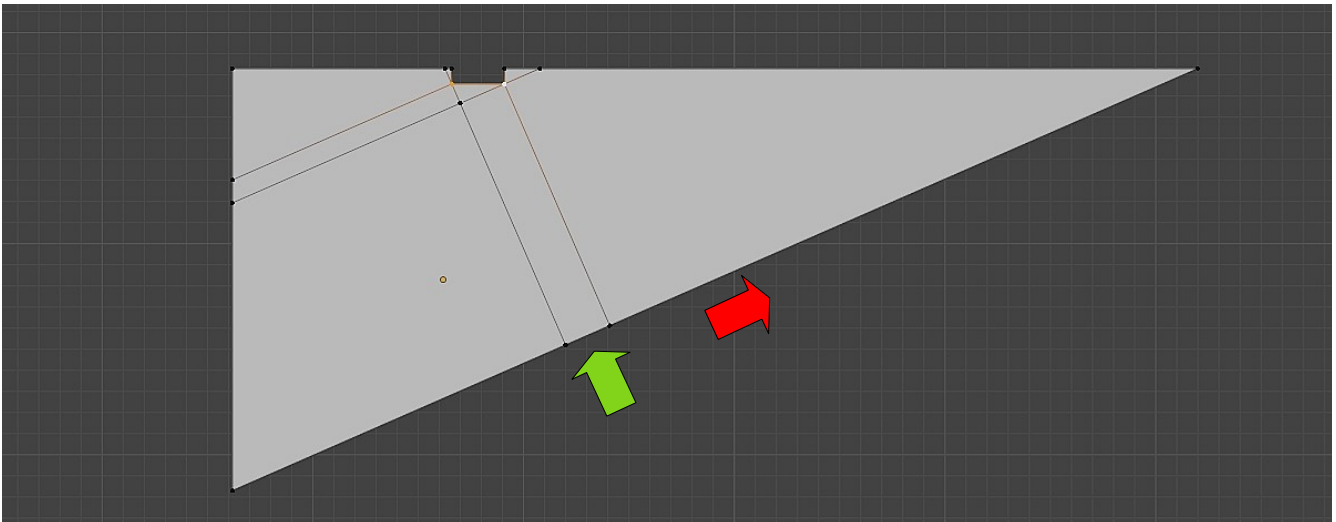


*Figure 49 - Shared faces of selected verts*

Shared faces refers to the faces that have the selected vertices in common. In the left of Figure 49, the 2 vert selection has 2 shared faces while the right which has 3 vert selection has only one. Wait, should the right have 3 shared faces too? Technically yes, but the script if possible will only get a face with the most vertices sharing it. In the left, since the 2 vert selection cannot come to a single specific face you are left to cycle between the two shared face using the Face parameter. Looking at the way this works, a single vert selection will leave you cycling through all its connecting faces. Having 3 or more vert selection focuses the operator entirely on that single face containing them.

If any of the vert selection does not share a face with the others, then this method is ignored and it will cut all the faces in the mesh instead. In this instance, to limit the cuts use the hide method.

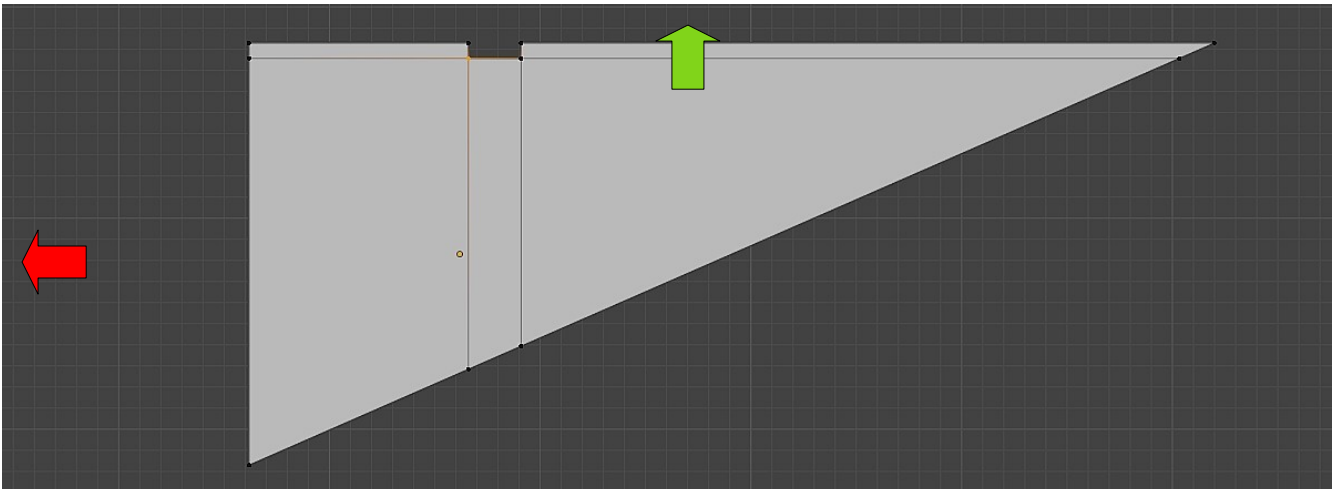
The shared face method was made so you can isolate a cut to a single face without having the need to hide/unhide faces and this can save some time since you don't have to push multiple buttons just to limit the cuts on that particular face.



*Figure 50 - Direction: Tangent*

The tangent or in this case the tangent edge refers to the longest edge in the face. In Figure 50, you can see cuts originate from the two selected vertices and the orientation of the cuts follow the direction of the tangent edge marked by the arrows ( $RGB = XYZ$ ).

Wait a minute, isn't the cut orientation already dictated by the face normal? No, we are just using the normal as the Cartesian plane. The operator still needs additional vector information to supplement the direction of the cuts in the x and y axis.



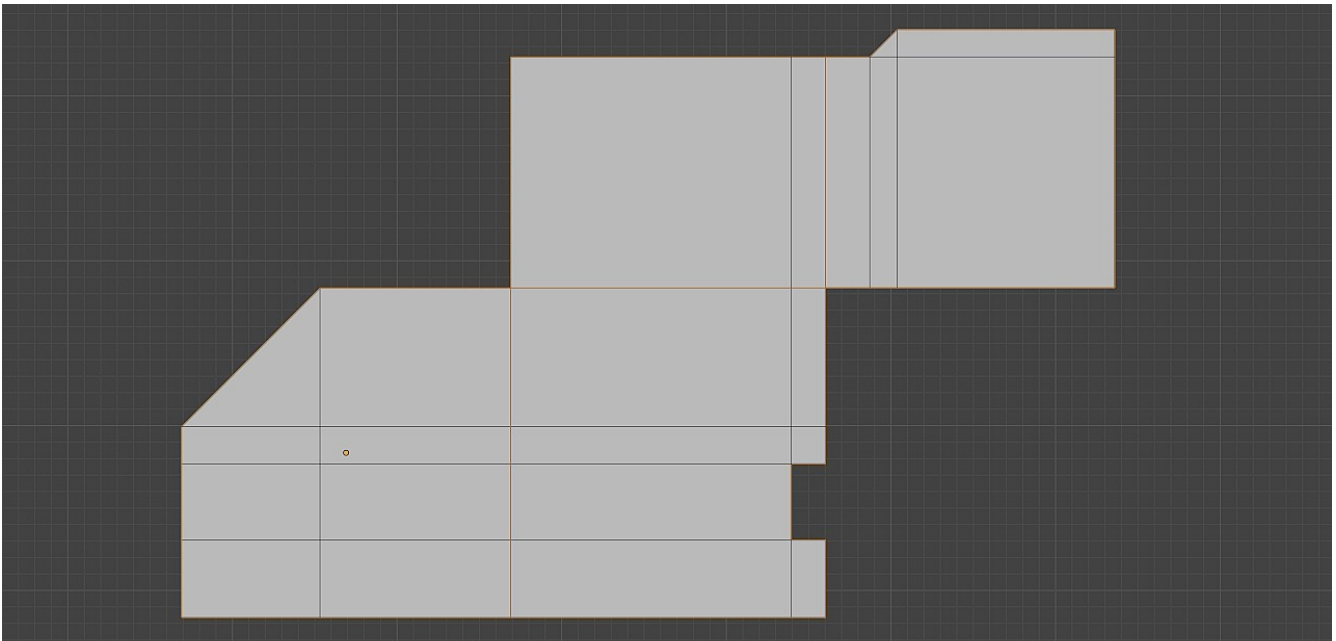
*Figure 51 - Direction: View*

In Figure 51, the view direction was used instead of the tangent. You can see that now the cut lines perfectly follow the x and y axis (marked by the arrows) of the viewport relative to the view angle from the face.

So when you cycle the Tangent parameter, you are iterating through all the tangent edges of the faces linked to the selected vertices. You are basically trying to look for the right direction to use for the cuts.

The Face parameter is selecting which shared face to cut.

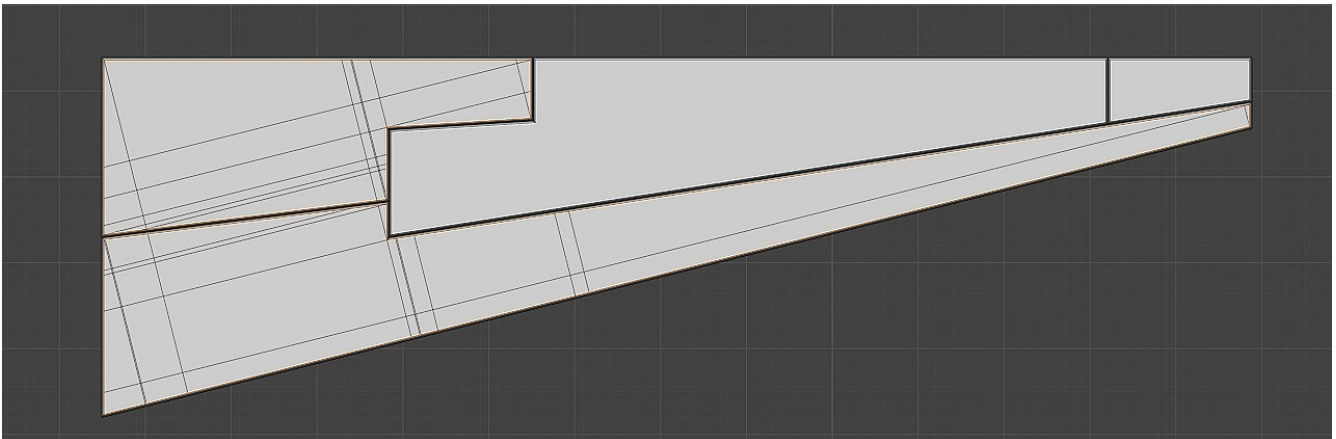
If the tangent edges do not provide the correct cut orientation, you can use the view method instead by aligning the viewport to the face. You can navigate the viewport to do this or use the hotkey Shift+Numpad 7 to automatically align the viewport to the selected element in edit mode.



*Figure 52 - Cut lines shooting in all selected faces*

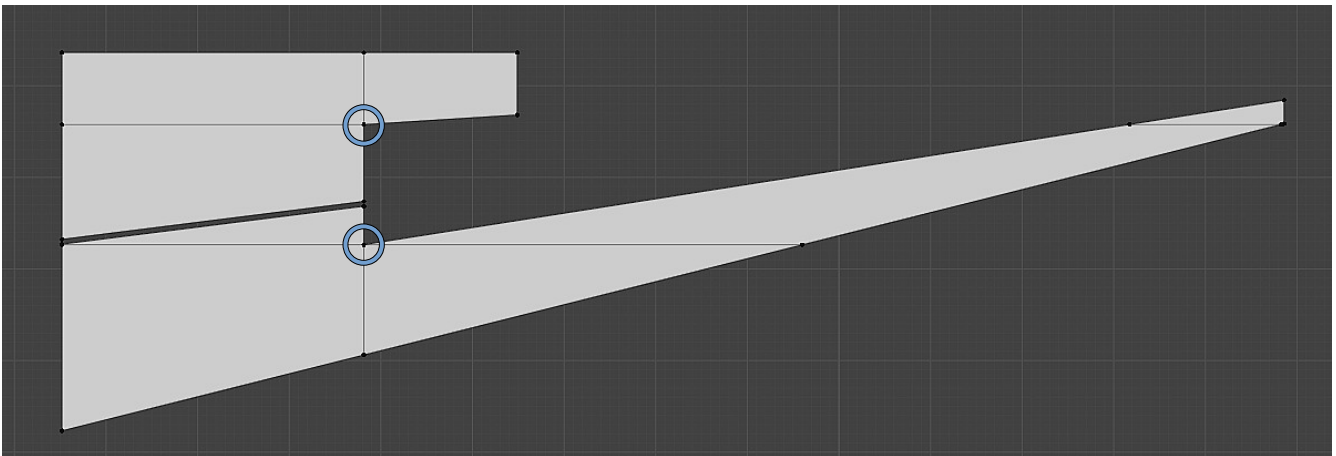
This operator works great on multiple face selections but be careful since all valid points will be cutting everything on that selection. This is true even if the selections are separate, as long as those elements are in the path of the cut direction, they will also be cut.

If an entire face selection creates unnecessary cuts to be drawn, try using vert selection and using the shared faces method to cut a particular face. If the vert selection do not activate the shared faces method for example 2 verts on 2 separate faces, use the hide faces method instead.



*Figure 53 - Bang! Bang! You bored now? Keep reading...*

Here, I was trying to quad 2 faces of a panel mesh. I selected the two ngon faces but since I selected all their vertices are selected as well there are unnecessary cuts everywhere.



*Figure 54 - Cuts from vert selections*

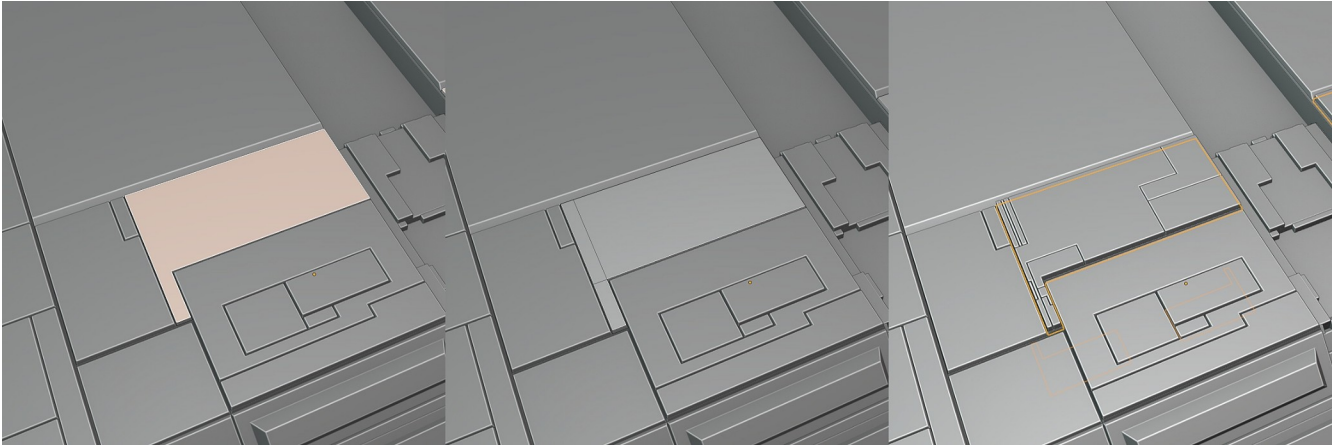
Here I used two vert selections instead, used the hide method since these two do not share a face and will default to cutting all faces in the mesh. You can see some of the limitations of the operator here. While upper face quads with no problem using the cut directions, the lower face has tris and ngons resulting from its own cut and the cut received from points in the upper face. This means that for some instances, you gotta go in and delete some cut edges manually (*X hotkey to show delete menu or Ctrl+X to delete instantly*).

Also, do not forget the knife tool in Blender. This operator is designed to make cutting from multiple origins easier and faster but for some simpler topology using the knife would be faster.

Practical application with the tool?

Remember the push and pull method using the hotkey Alt+S on top faces from cells/islands made using Random Extrude and Random Panels that has been limited dissolved to create ngon faces?

The Quad Slice operator makes it easier to quad those faces back if you decide to use the random operators again on them.



*Figure 55 - Ngon to quads to Random Panels*

In the image above, the ngon face (*left*) was quadified using the Quad Slice operator (*middle*) then those faces are used to create the paneling detail (*right*).

With a push of a button, you can quickly quad selected elements back up in order for the random operators to work nicely on them. The subdivision in particular since it doesn't work on ngons.

This will work optimally on angular faces but can operate on curved surfaces as long as you have the correct cut orientation.

It can be confusing at first, but if you keep it simple at first you'd eventually appreciate its awesome potential.

# EXTRAS

## \* Set Origin

Remember the object orientation needed for the scatter objects in Figures 30 and 31? The Set Origin operator makes it easier for you to change the origin of the object at their very bottom point or in the case of the human character exactly where her feet would touch the ground.

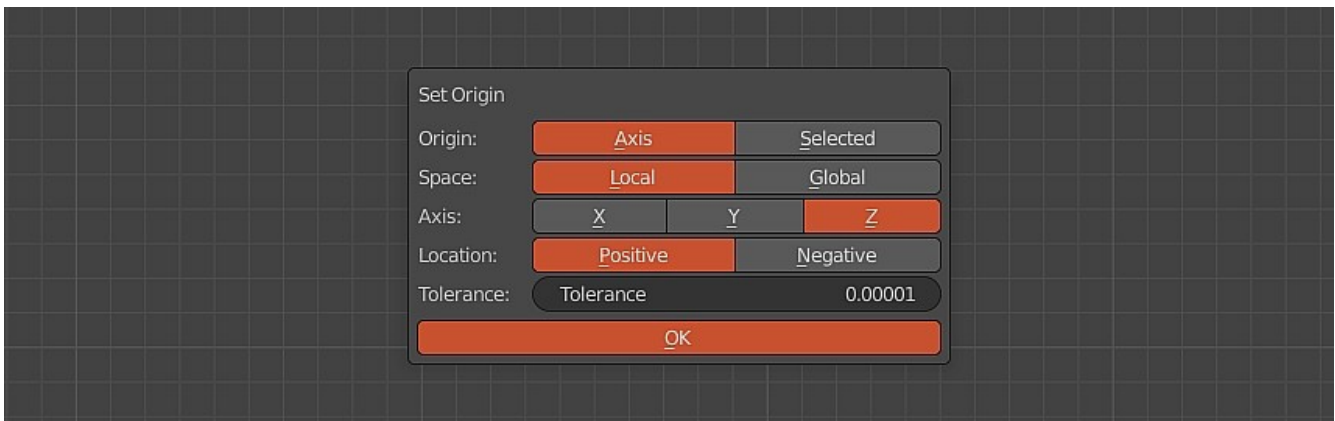


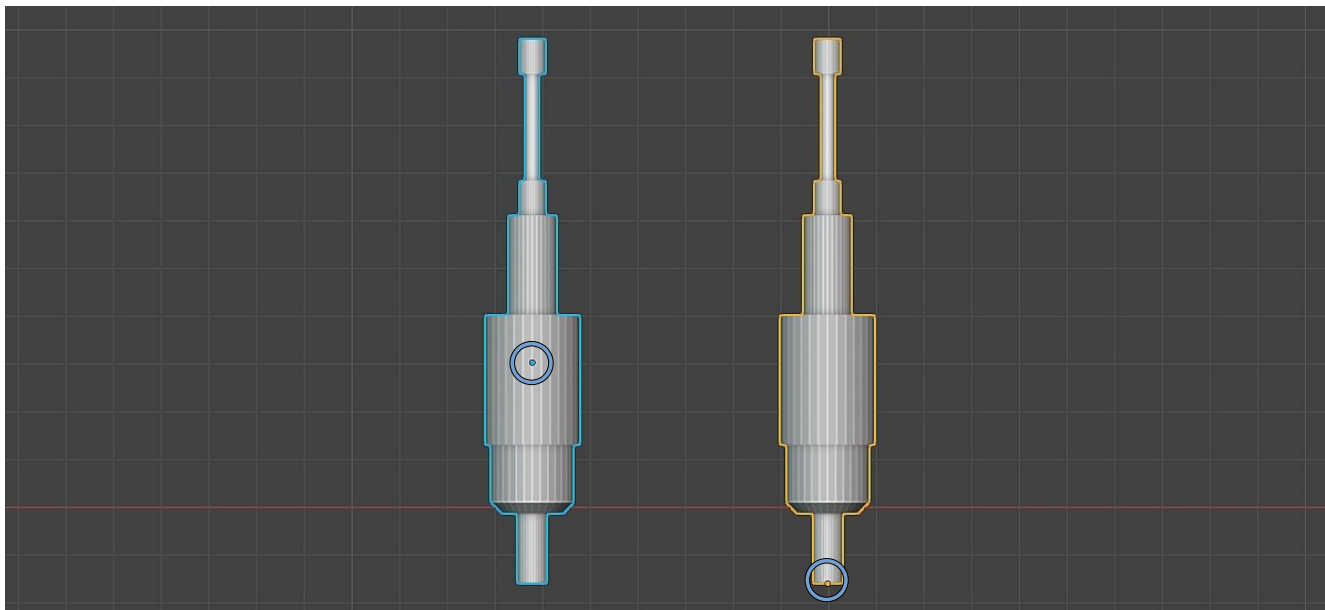
Figure 56 - Set Origin undo menu

Figure 56 shows the default settings of the undo parameters when the operator is used. To set the origin of the scatter object standing up to the farthest point at their “feet” use Z axis and Negative location.

The script actually looks for the farthest vert or point in the mesh. Increasing the Tolerance factor means more vertices can be accrued from that point and their average location used for the new origin. The default value of  $1e-5$  or 0.00001 is already optimal but it was only exposed to give you more control.

We’ve already discussed the Local and Global matrix in Scatter Objects and this is set to Local as default so even if the object is rotated it will still capture the correct location in local space. For example, if you rotate the human model a bit, the farthest bottom point using global space would be somewhere on the sides of their feet whereas in local space it would still be at the bottom of their feet – assuming you haven’t applied the rotation.

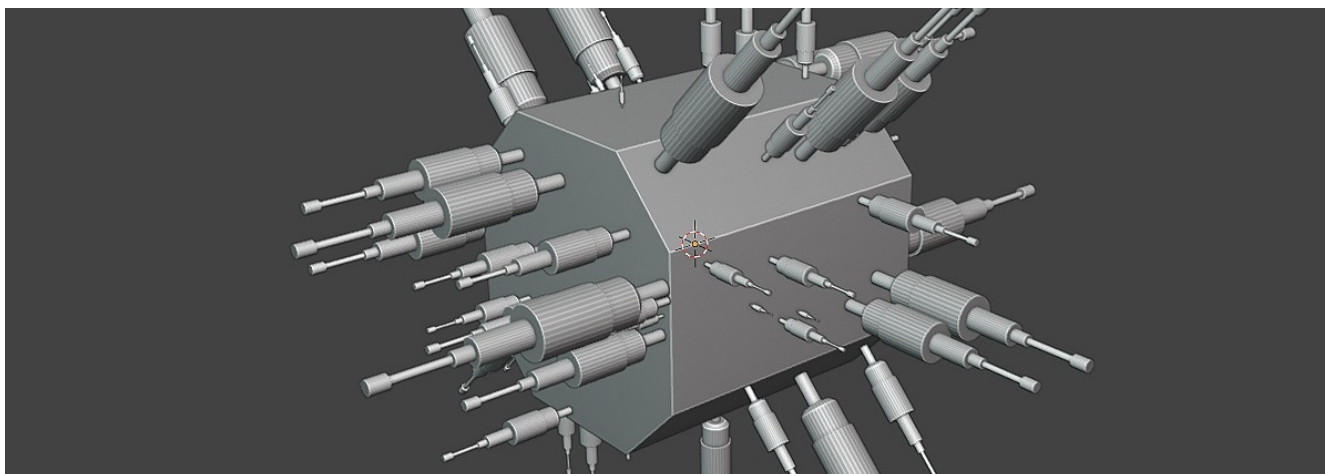
I've added the option to change the axis to X and Y as well just in case you might want to use this other than correctly setting the origin for scatter objects.



*Figure 57 - Origin switch to farthest point in negative Z axis*

Adding a cylinder to the scene in the image above, I modeled it a bit to result in that shape. In the left object, you can see the original origin of the cylinder and in the right after the set origin is used using local space and negative Z axis.

To the standing human figure, using the positive Z axis means farthest point towards the head so that's at the very peak of her dome. Negative Z axis means towards her feet.



*Figure 58 - Scatter object using the new origin*

For your convenience, this operator will work on multiple selections.

## Clean Up

The Clean Up operator is a collection of resolution reducing toggles designed to create an optimal resolution count for the randomized objects.

### Undo Parameters

Parameter	Function
Remove Doubles	Removes overlapping verts in the mesh.
Merge Distance	Maximum distance between elements to merge.
Limited Dissolve	Dissolve selected verts and edges, limited by the surrounding geometry.
Max Angle	Angle limit for the limited dissolve function.
* Clip Center	Clip center axis verts if mirror modifier is present. Gets rid of axis faces too. (See <i>Figure 6</i> )
* Clip Distance	Distance within which center vertices are clipped.
Degenerate Dissolve	Removes zero area faces and zero length edges.
Merge Distance	Maximum distance between elements to merge.
* Remove Face Doubles	Removes faces that share the same location.
* Remove Singles	Removes two edge verts or vertices with only two connecting edges.

The Clean Up operator can work with multiple object selections in object mode. If you want to keep the cell/island structures especially with Random Extrude and Random Panels, don't use remove doubles since this will merge overlapping verts on separation areas/edges between the islands.

Use this to reduce the overall resolution of the scene specially when you already have plenty of randomized objects.

## **SETTINGS**

### **Select Active**

The Select Active toggle when enabled will always select and make active the source objects after every random operation. Toggling this off will select and make active the randomized object(s) instead. For multiple random object generation like Random Extrude, the active one will be the last loop object.

### **\* Copy All Modifiers**

This is off by default which means the randomized objects will only inherit the mirror modifier from the source object. If toggled on, the randomized objects will inherit all modifiers from the source object. Be careful with this one as some modifier combinations especially those that increase resolution like the Subdivision modifier can affect the speed of the random operations.

## USEFUL COMMANDS

Hotkey / Operator	Function
L – Select Linked	Selects face islands in edit mode by hovering on an element. Ctrl+L does the same thing but skips hover and uses the selected element.
J – Connect verts	Connects vertices. Works with selection history.
K – Knife Tool	Initiates the knife tool in edit mode. Additional toggles can be found at the bottom bar of the viewport.
Ctrl+B – Bevel	Bevels selected edges in edit mode. Ctrl+Shift+B bevels vertices instead. Additional toggles can be found at the bottom bar of the viewport.
I – Inset	Insets selected faces in edit mode. Additional toggles can be found at the top bar of the viewport.
E – Extrude	Extrudes selected faces.
W > S – Subdivide	Subdivides selected edges or faces.
W > I – Bridge	Bridges or connects two selected edge loops.
Alt+N – Normals	Opens the normals menu.
M – Merge	Opens the merge menu.
X – Delete	Opens the delete menu.

	Ctrl+X removes/dissolves the selected element based on selection mode.
. (dot) – Pivot	Opens the pivot points pie menu.
, (comma) – Orientation	Opens the orientation pie menu.
W – Context menu	Opens the context menu for object and edit mode. Contains different functions like setting object origins, convert, shade smooth/flat etc.
Q – Quick Favorites	Opens the quick favorites menu. You can assign items here by hovering over a button and Right Click > Add To Quick Favorites – same method is used for removal.
H/Alt+H – Hide/Unhide	Hides or unhides objects in object mode, elements in edit mode.
V – Rip vertices	Split or rip selected vertices.
B – Box select	Initiates box selection.
C – Circle select	Initiates circle selection. <i>(I find this useful for selecting faces when subdivision is kept in Random Panels.)</i>
Shift+G – Select similar	Select similar traits from selection. <i>(Useful for getting coplanar faces in edit mode or selecting singles for example.)</i>
Shift+S – Snapping	Opens the snapping menu.
Ctrl+V/E/F – Context menu	Opens the vertices, edges or faces contextual menu containing functionalities used for that particular element.
Ctrl+R – Loop cut and slide	Creates loop cuts on edges.

## LINKS

Thank you for reading all those texts! Whew! You still good?

Here's a list of links you can use to contact me if you have further questions:

<https://facebook.com/blenderguppy>

<https://twitter.com/blenderguppy>

<https://instagram.com/blenderguppy>

Discord: <https://discord.gg/GUftHR3xYF>

Youtube: <https://youtube.com/c/blenderguppy>

Patreon: <https://patreon.com/blenderguppy>

Thank you for the support! I'll be adding more fun random operators in the future. All updates are free. An email notification will be sent to you if the store files are updated and you can just log in there and get the files for free. If you see me post the update in social media and you haven't received the email you can just skip this and go directly to the store.