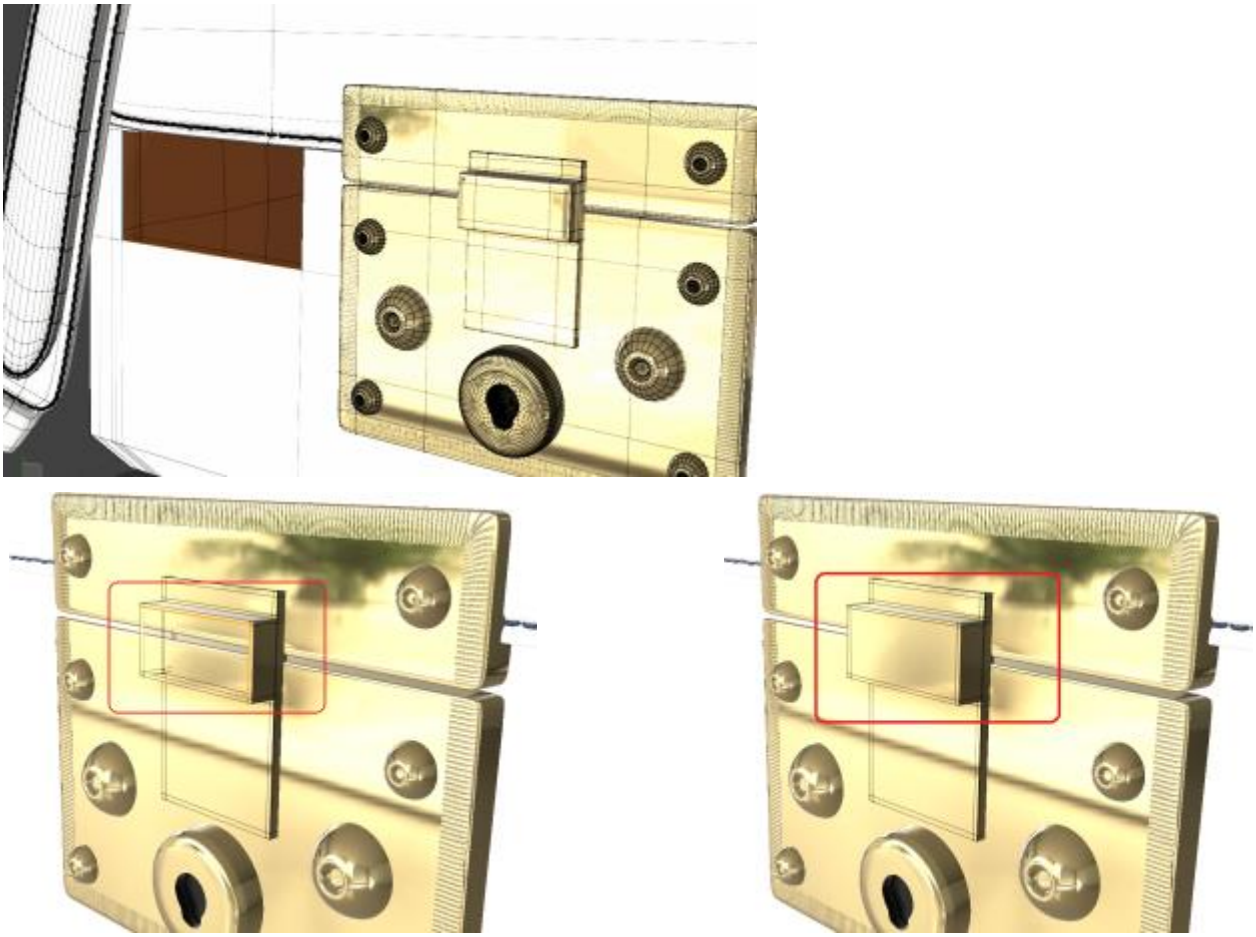
Polygon Tools

The following are useful actions you might want to do using **Polygon** tools.

Make

Automatically create a quadrangle polygon by selecting two edges on an object and clicking **Make** from the **Polygon** tab of the Modo **Tools**, or by pressing **P**. The **Make** command calculates where the endpoint vertex of the two selected edges is to create a new polygon, and merges all connecting edges together.

To access the **Make** tool, open the Polygon tab of the Modo **Tools** toolbar.

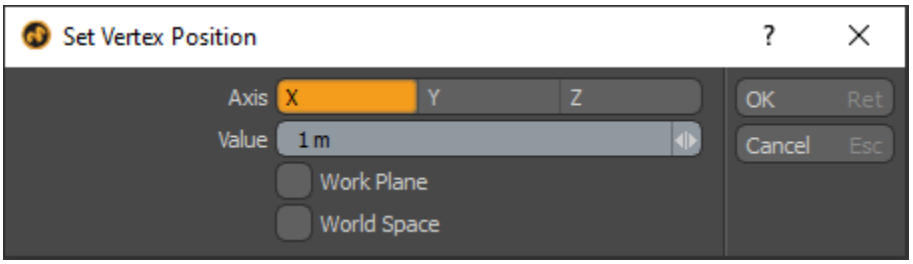


Selecting two edges and pressing **P** to create a merged quadrangle polygon.

Tip: Press and hold **Alt** in the **Polygon** tab of the Modo **Tools** toolbar to switch from **Make** to **Make Polygon**. The **Make Polygon** tool is similar to **Make**, except it provides some additional user preferences and can be performed on vertices. See Make Polygon for more information.

Set Position...

Offset the position of a selected polygon, vertex, or edge by an amount specified in **Value** along a specified **Axis**.



The **Set Vertex Position** dialog.

Tip: Enable **Work Plane** to align the offset along the work plane's axes.

Split

To split polygons, select two vertices on a polygon to force an edge to be drawn between them. Vertices can also be selected in succession across polygons.

Triple

The **Triple** command subdivides any selected polygon with more than 3 vertices so that it consists only of triangle polygons. This can be very useful for preparing data to be saved in a format that does not support polygons with more than 3 vertices per polygon. It can also be useful for quickly breaking an n-gon down into triangles for similar export issues.

Alternatively, use the Mesh Operation, **Triangulate**, to subdivide polygons in your model. For more information, see Triangulate.

Convert to Quadrangles

Found in the menu bar under **Geometry** > **Polygon** > **Quadruple** or, within the **Topo** tab toolbox, the **Convert to Quadrangles** command takes a series of vertices from an N-gon and creates a row of regular four sided (quadrangle) polygons. This is useful in creating quad strips, especially when re-topologizing a model. Using the **Pen** tool, lay down two opposing rows of vertices, then invoke the **Convert to Quadrangles** command and Modo automatically adds edges spanning between the opposing vertices, making quad polygons.

Spin Quads

The **Spin Quads** command changes where your edges are attached within the geometry. For example, if you select two adjacent polys, this command spins them so that they attach to different points while leaving them in place. It changes the flow of your polygons while maintaining the surrounding mesh. **Spin Edges** does the same thing on an edge level, however, you can select one edge and spin it so that it bisects two polygons differently. **Spin Quads** only works with two polygons with the same edge number.

These tools are found on the **Edge** and **Polygon** tabs of the Modo **Tools** toolbar, under the **Commands** groups.

Flip

The **Flip** tool reverses the direction of selected polygons. Polygons are typically single sided and, as such, are only visible from one direction. The visible side is determined by the direction of the normal. The direction of a polygon is initially determined by the order in which its vertices were created, or selected, to make the polygon. The **Flip** tool effectively re-orders those vertices so that

the polygon faces the opposite direction. For linear polygons, such as curves, the **Flip** tool reverses the order to force the curve to run the opposite direction.

Align

The **AlignPolygons** tool attempts to automatically make all polygons face the same direction. Use this when you have mesh geometry with polygons that have face normals facing both toward and away from the view. **Align Polygons** uses the first polygon you select as the model. It attempts to match the face normal direction of that polygon.

Make Curve Fill

Found under the **Commands** section of the **Polygons** toolbox, the **Make Curve Fill** command converts a closed curve, or a series of connected curves, into a renderable flat polygon's surface. It works with both Bezier or Spline curve types and is especially useful for rendering simple vector graphics.

Tip: Bezier curves for curve fill polygon types can be created by importing an **.eps** file, or by converting text to Beziers using the **Convert Text to Beziers** command. Curve fill polygons can also be created by turning on the **Fill** option on the **Curve** and **Bezier** tools.

Merge

The **Merge Polygons** option combines selected polygons into a single polygon of n-number of sides. Essentially, it removes all interior edges, so the multiple polygons can be treated as a single polygon.

Note: More complex selections merge as many polygons together as necessary to remove the target edges. If all the edges that use a vertex are deleted, then the vertex is deleted as well. It may be possible for you to specify selections that cannot all be consistently deleted. In that case the operation does the best that it can without leaving "spikes", which are edges entirely internal to a single polygon.

Polygon Merge is useful for cleaning up geometry where you have many coplanar edges.

The following video demonstrates this:

To open the Merge Polygon tool:

- On the left panel, open the **Polygon** tab, under the **Commands** section, click on the **Reduce** pulldown, and select **Merge**.
- On the menu bar select **Geometry** > **Polygon** > **Merge**.
- On the right panel, open the **Mesh Ops** tab, click **Add Operator**, and double-click **Mesh Operations** > **Polygons** > **Polygon Merge**.

Procedural Polygon Merge

Polygon Merge is also available as a mesh operation.

> **Tip:** For more information on procedural modeling and mesh operations, see Procedural Modeling with MeshOps.

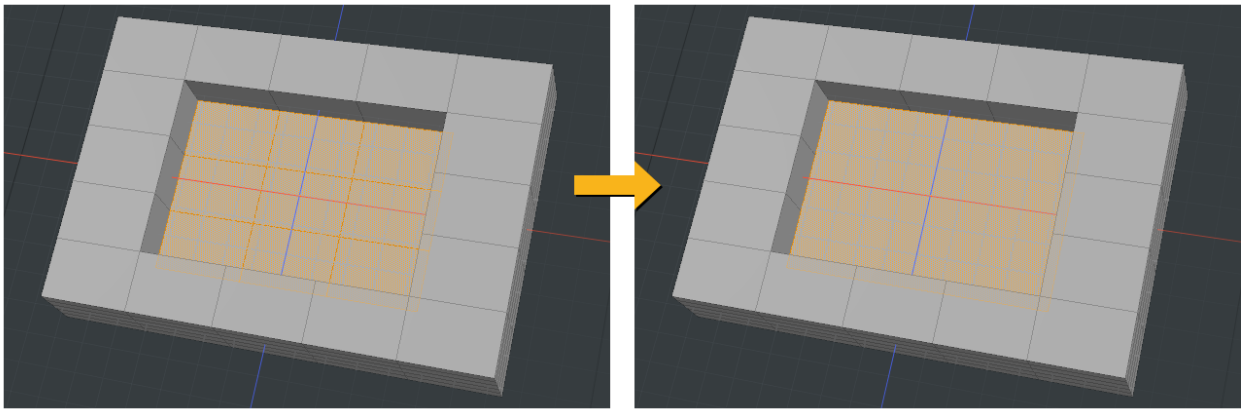
To use the tool:

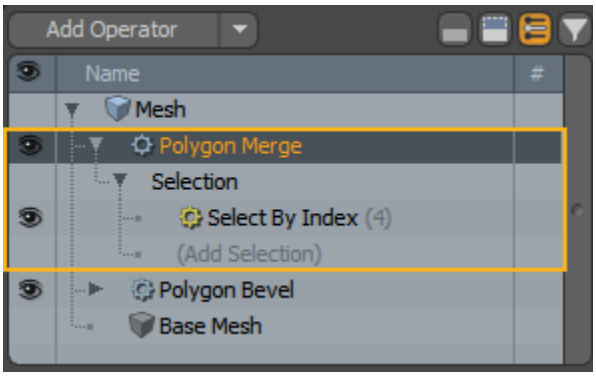
1. In **Polygons** selection mode, select the polygons you want to merge.
2. On the right panel, click the **Mesh Ops** tab.

> **Note:** If you're working in a layout where the **Mesh Ops** tab is not visible by default, click the **+** button on the right of the tab names, and select **Data Lists** > **Mesh Ops**.

3. Click the **Add Operator** button, and click **Mesh Operations** > **Polygon** > **Polygon Merge**.

   This adds Polygon Merge to the Mesh Operations list and opens its properties on the lower right pane. You can see the selected polygons merged in the 3D viewport.





You can expand the **Polygon Merge** mesh operation in the list by clicking the arrow in front of it. This reveals the inputs the operation uses:

- **Selection** - Select polygons to merge or modify your existing selection. For more information on procedural selection, see Procedural Selection.

Polygon Merge in the Schematic

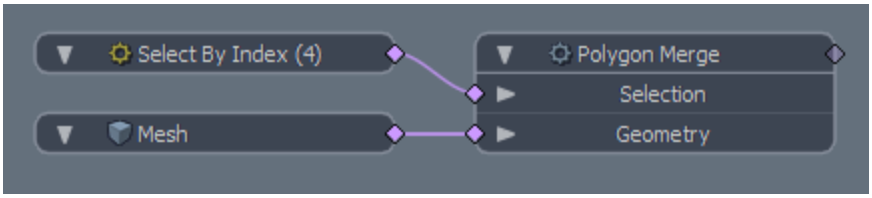
You can also use the Polygon Merge tool when working in the Schematic viewport.

> **Note:** For more information on working with Schematic viewport in general, see Schematic Viewport.

To open the Schematic viewport, either:

- Switch to the **Setup** layout from the menu bar by clicking **Layout** > **Layouts** > **Setup**.
- Open only the viewport from the menu bar by clicking **Layout** > **Palettes** > **Schematic**.
- In the **Model** and **Modo** layouts, click the Schematic button.

To add the Polygon Merge node, click **Add...**, and click **Mesh Operations** > **Polygon** > **Polygon Merge**.



The node has the following inputs:

• **Selection** - Select polygons to merge or modify your existing selection.

• **Geometry** - Any geometry that is affected by the tool.

Collapse

The **Collapse** command removes the selected element without destroying the integrity of the geometry. Any select polygon, edge, or vertex is deleted but no hole is left behind. Instead, the mesh heals, closing any gaps by merging the neighboring elements together.

Polygons: On the **Polygons** tab of the **Modo Tools** toolbar > **Commands** > **Reduce** > **Collapse**.

You can also select whatever geometry you wish to collapse and then choose **Geometry** > **Collapse**.

For more examples, see Reduce Collapse Tools.

Collapse Selection

The **Collapse Selection** command removes the selected element without destroying the integrity of the geometry. Any select polygon, edge, or vertex is deleted but no hole is left behind. Instead, the mesh heals, closing any gaps by merging the neighboring elements together and merging together at the center.

Polygons: On the **Polygons** tab of the **Modo Tools** toolbar > **Commands** > **Reduce** > **Collapse Selection**.

For more examples and information about **Collapse Selection**, see Reduce Collapse Tools.

Remove

The **Remove Polygon** command deletes the selected polygons, completely removing them from the selected Mesh Item layer. The command is found within the **Modeling** tabs under the **Polygon** toolbox, or in the menu bar under **Geometry** > **Remove**. You can also simply press the **Backspace** key on the keyboard.

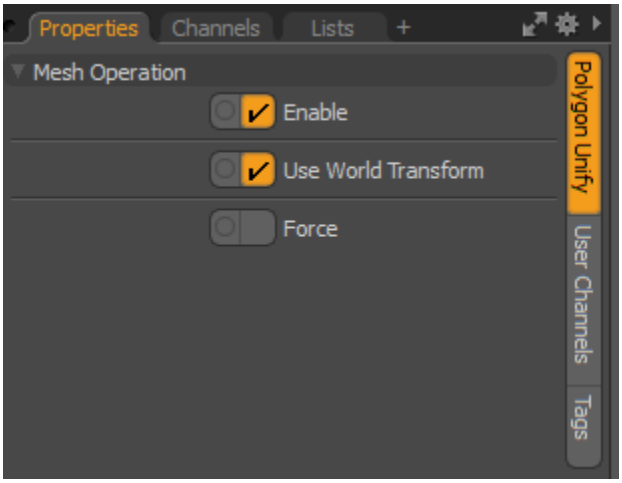
Unify

Unify Polygons lets you merge two polygons into a single polygon when you have two polygons that are in exactly the same position and the polygons share the same vertices.

To access the **Unify Polygons** tool:

- On the left panel of the Model layout, open the **Polygon** tab , click the dropdown arrow next to **Reduce**, and click **Unify**.
- Alternatively, on the right panel open the **Mesh Ops** tab, click **Add Operator**, and double-click **Mesh Operations** > **Polygon** > **Polygon Unify**.
- Alternatively, on the top left corner of the interface, click the **Schematic** palette icon , click **Add...**, and double-click **Mesh Operations** > **Deform** > **Polygon Unify**.

Polygon Unify Option



- **Enable** - Enables or disabled the Push tool.
- **Use World Transform** - Sets the coordinates from Model Space to World Space where vertices are defined relative to an origin common to all the objects in a scene.
- **Force unify** - Forces polygons to merge together to create one polygon.

Convert Text to Bezier

Precisely as the name implies, this command converts geometry created with the **Text** tool to Bezier curves. To use, type out a line of text using the **Text** tool, and then invoke the menu bar command **Geometry** > **Convert Text to Bezier**. Converted text becomes a collection of merged

Bezier curves and can be further edited using the **Bezier Curve** tool. If desired, the **Make Curve Fill** command converts the curves back into render-able shapes.

Detriangulate

Converts triangle pairs to quadrangles by deleting edges to share triangle pairs. This conversion tool evaluates the flatness of the geometry.

- For Direct Modeling, the **Detriangulate** tool is found under the **Geometry** > **Polygon** menu. To enable this tool, first apply the Automatic Retopology Tool.
- For Procedural Modeling, the **Detriangulate** tool is found under the **Mesh Ops** tab. Click **Add Operator** and select **Mesh Operations** > **Polygons** > **Detriangulate**.