

Rhino / Grasshopper

GrassToGrasshopper

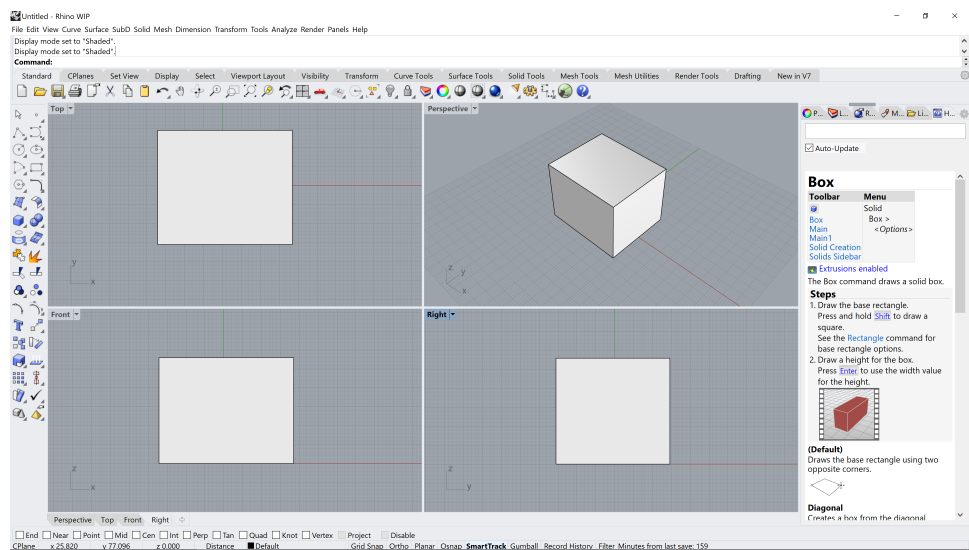
Rhinoceros3D" Rhino"GrasshopperTHCADNURBS" Rhinoceros 7"Grasshopper-THCAD ConnectionTHCAD BIM V21"Rhino / Grasshopper"

RhinoNURBSGrasshopperCADBIM

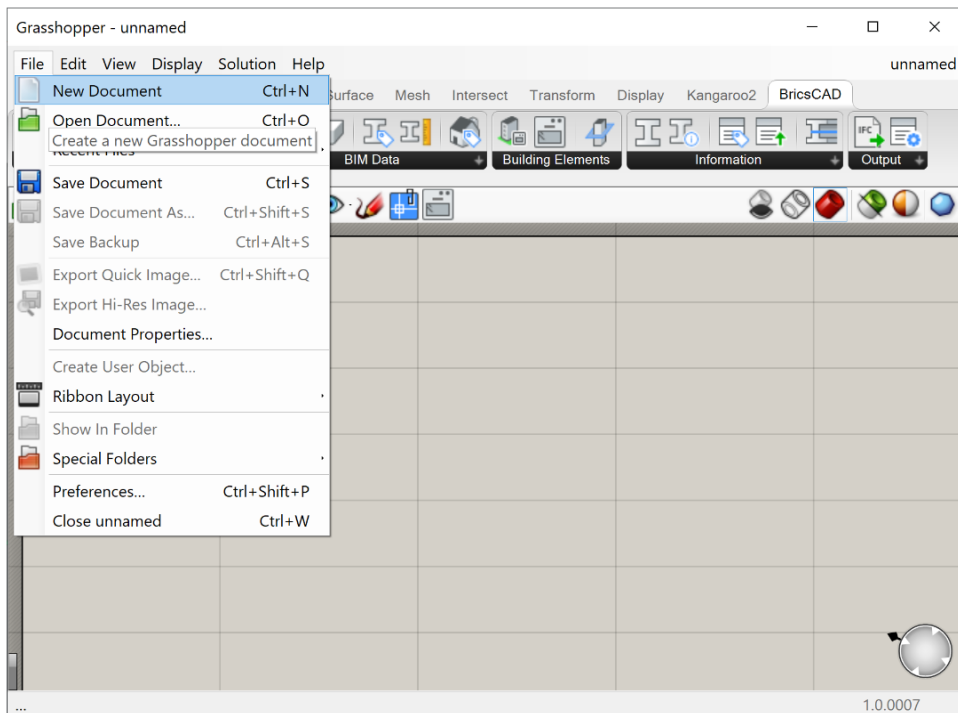
Rhinoceros3DRobert McNeelAssociates3DRhinoNURBS *GrasshopperRhinoceros 3DRhino3D

RhinoGrasshopperTHCAD

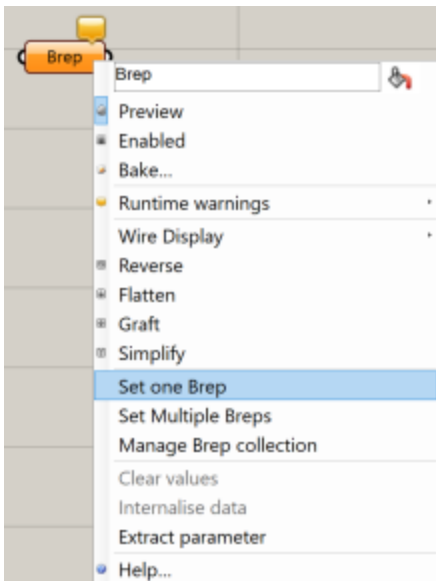
- 1. THCAD
- 2.
- 3. THCAD, **Grasshopper > Rhino**
- 4. RhinoBOX (THCAD **Box**)
- 5.
- 6.
- 7.



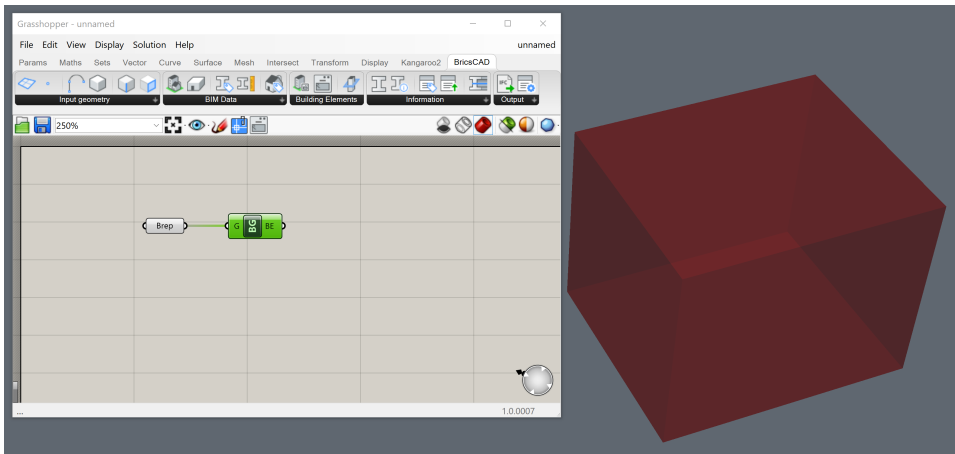
- 8. GrasshopperGrasshopperGrasshopper> GrasshopperFile> New document



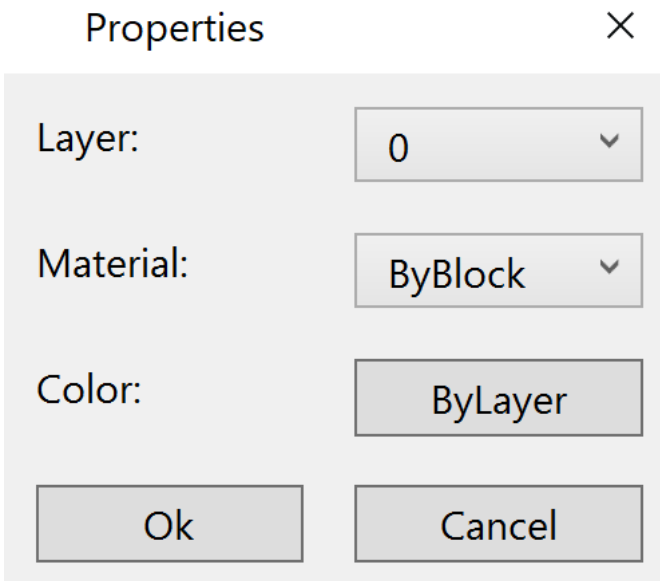
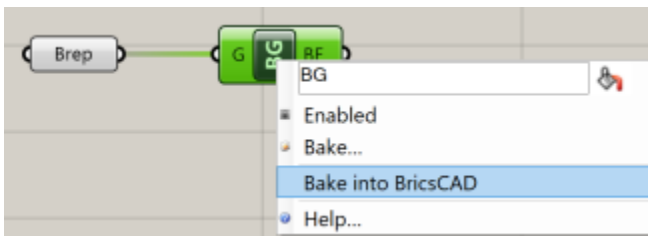
- 9.
10. **Params> Geometry> BrepGrasshopper**
11. **"Brep"**



12. Rhino
13. BrepRhinoGrasshopperTHCAD
14. **THCAD>>Grasshopper**
15. BrepTHCAD Bake



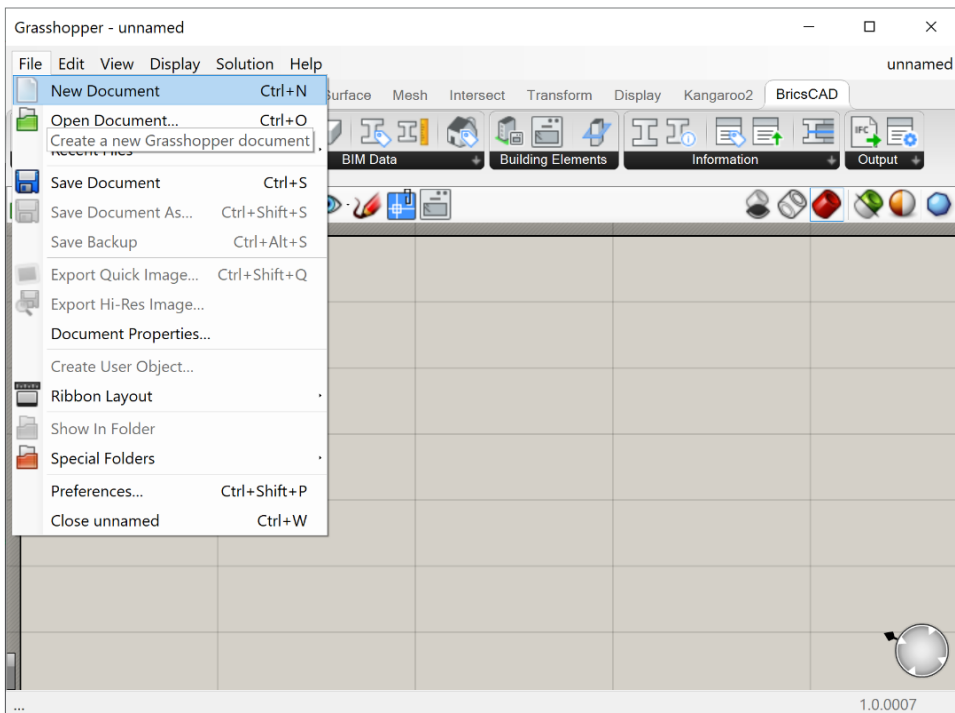
16. "THCAD"



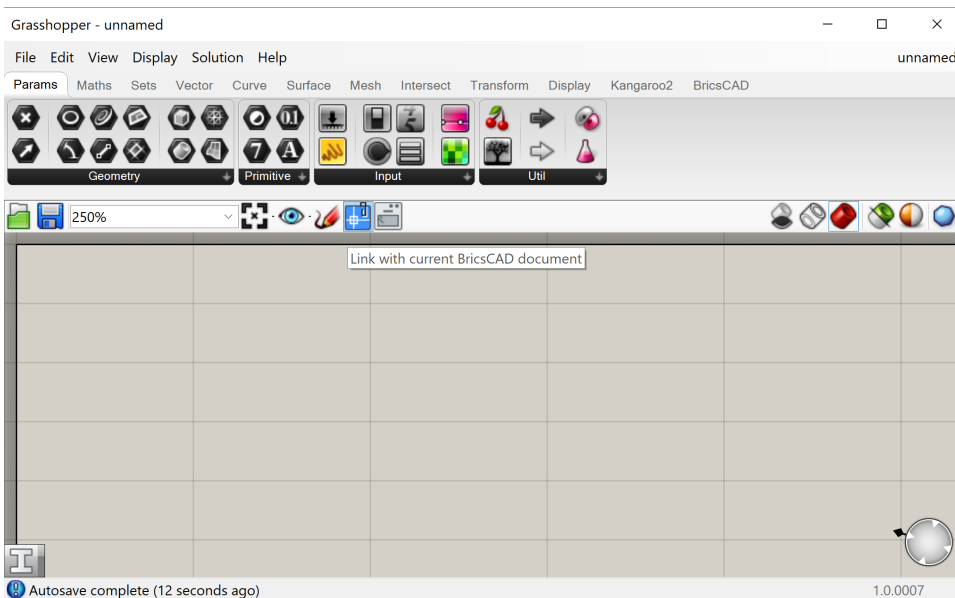
17. THCAD

THCADGrasshopper

1. GrasshopperGrasshopperGrasshopper> GrasshopperFile> New document

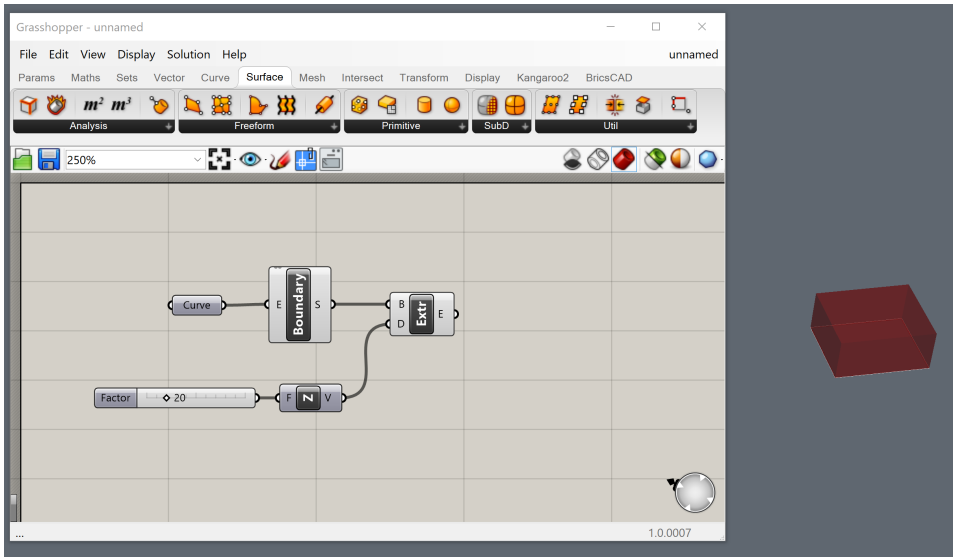


2. THCAD
3. .dwg^{THCAD}



4. THCAD
5. THCAD>>Grasshopper
6. ^{THCAD}THCAD
7. THCAD
QuadTHCADQuadGrasshopper ToGrasshopperGrasshopperGrasshopper
8. Link the Curve component to a **Surface > Freeform > Boundary Surfaces** component
9. Link this to a **Surface > Freeform > Extrude** component.
10. In the Direction input of the Extrude component link a **Vector > Vector > Unit Z** component with **Params > Input > Number Slider** component.
Set this to the height of your box, 17 for example. **Note:** you can edit the range and preciseness of the slider by right-clicking the component and

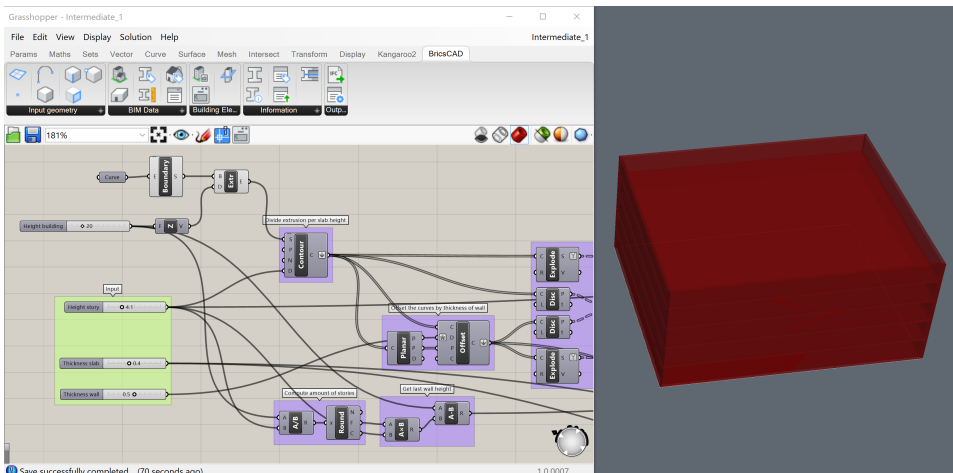
selecting 'Edit...'. A dialog box pops up where you can set the digits and min and max value of the slider.



11. You now have drawn a box in Grasshopper, using THCAD geometry as an input!

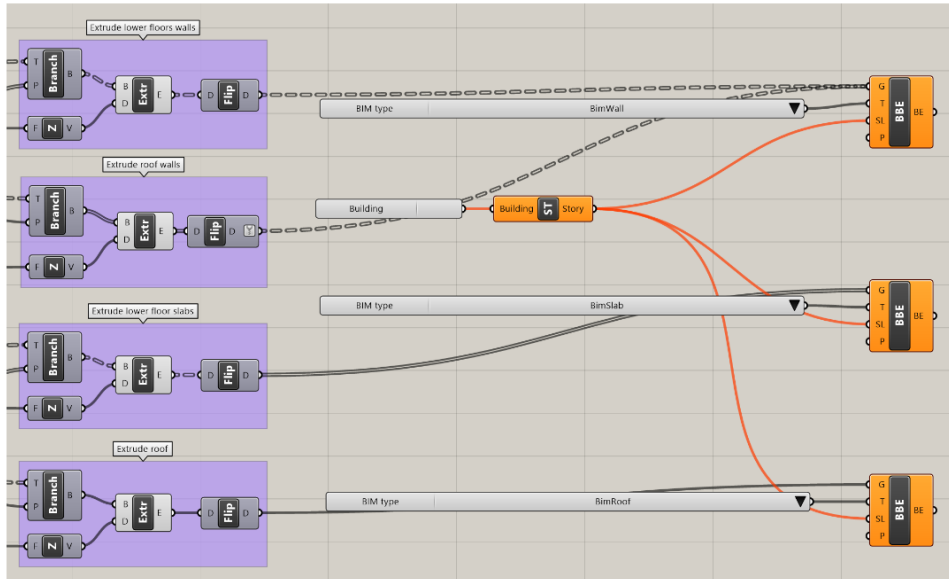
How to split up a box into different floors using Grasshopper

1. Add the 'Start_1.ghx'-code to your previous Grasshopper script.
 - You do that by downloading the zip file at the bottom of this page and extracting its content.
 - Then open the 'Start_1.ghx' file by going to **File > Open Document...** in your Grasshopper window.
 - You can now select all of the Grasshopper code by hitting **Ctrl+A** on the keyboard and copy it using **Ctrl+C**.
 - Then switch back to the document you were working on in the previous procedure by going to the upper right corner of the Grasshopper window and clicking on the title of the current document (Start_1).
 - You then get a drop-down of all the active Grasshopper scripts, so open the one you saved in 'How to draw a box in Grasshopper from a THCAD rectangle'.
 - Now click on the canvas and hit **Ctrl+V** to paste the 'Start_1.ghx'-code.
2. " Height building"
3. ⁴²⁷⁵⁴²⁷⁷ A ⁴²⁷⁵⁴²⁷⁷ A
4. ⁴²⁷⁵⁴²⁷⁷

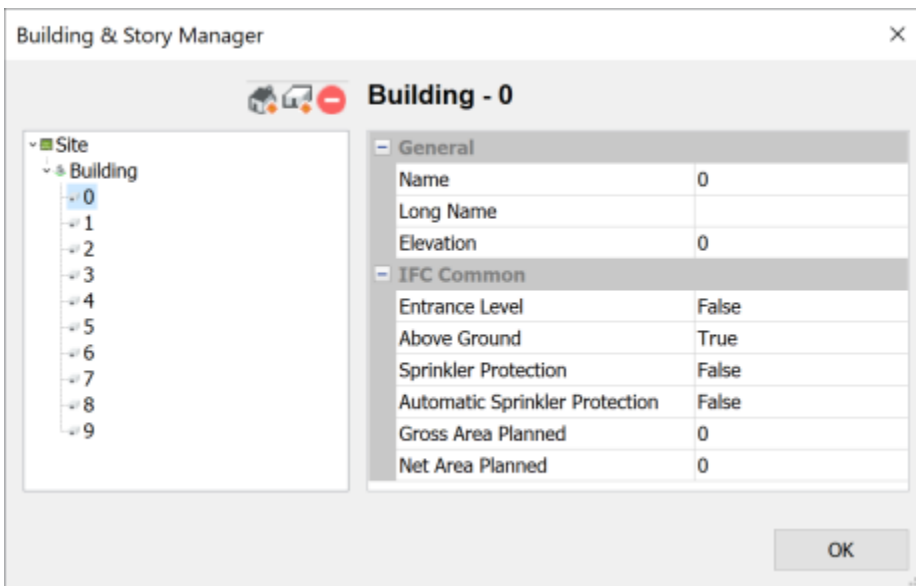


5.
 - 4277
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 - Shift""
6. " Intermediate_1.ghx"" Intermediate_1.dwg"zip
7.
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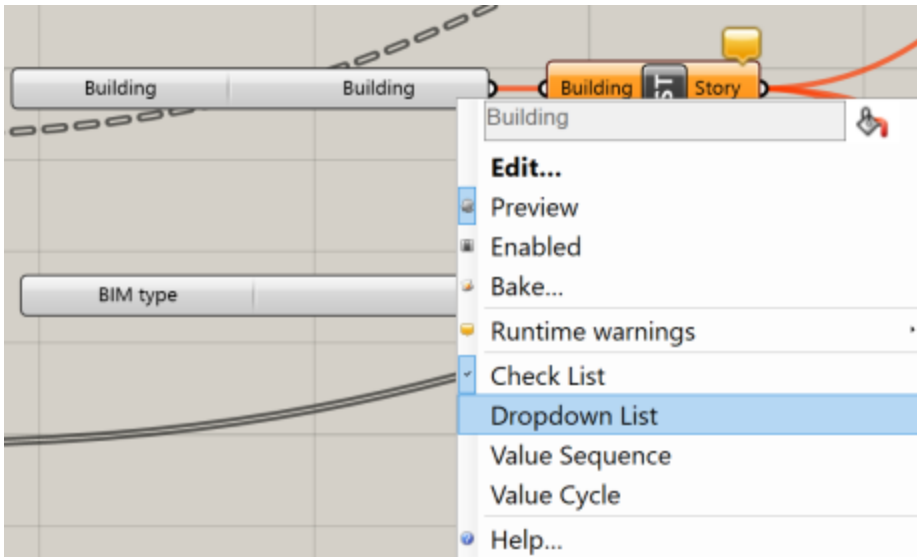
-
-
- 1159
8. 3THCAD>>Grasshopper
9. 115911591159
 - 1159 Shift
 - 1159
 - Bake Building Element
10. THCAD> BIM113 BIM
11. 1159115911591159
12. BIMBimWallBimSlabBimRoofBake Building ElementElement Type
13. 1159THCADGrasshopper



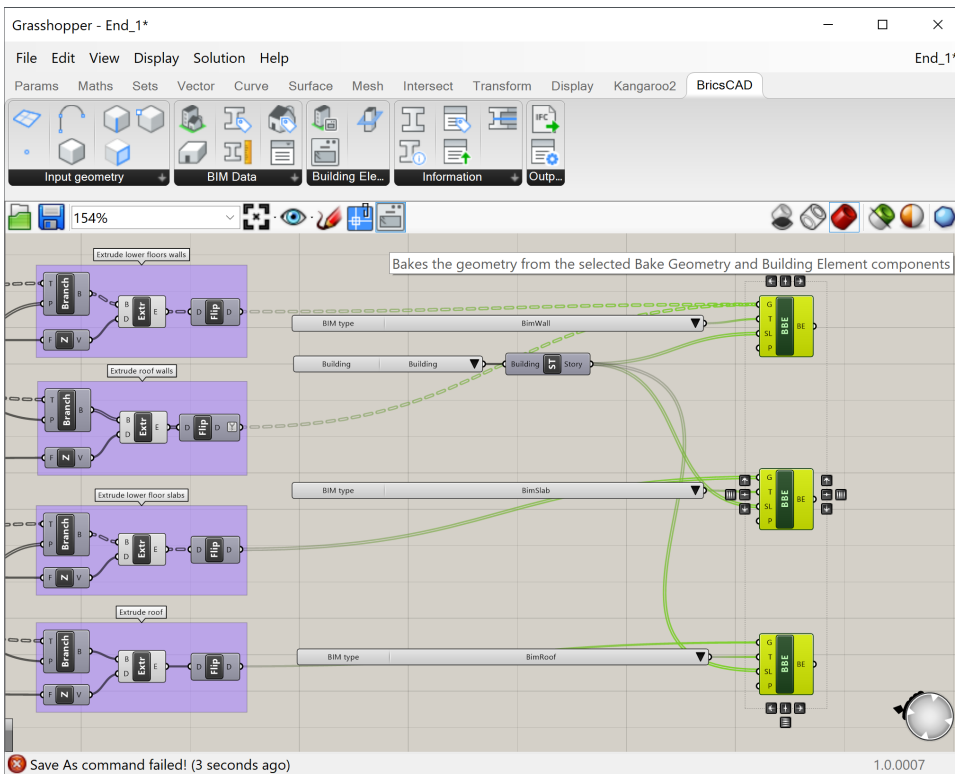
14. THCAD"1">"1">"1"
- 15.



16. GrasshopperBuildings“ Dropdown List”“ Check List”

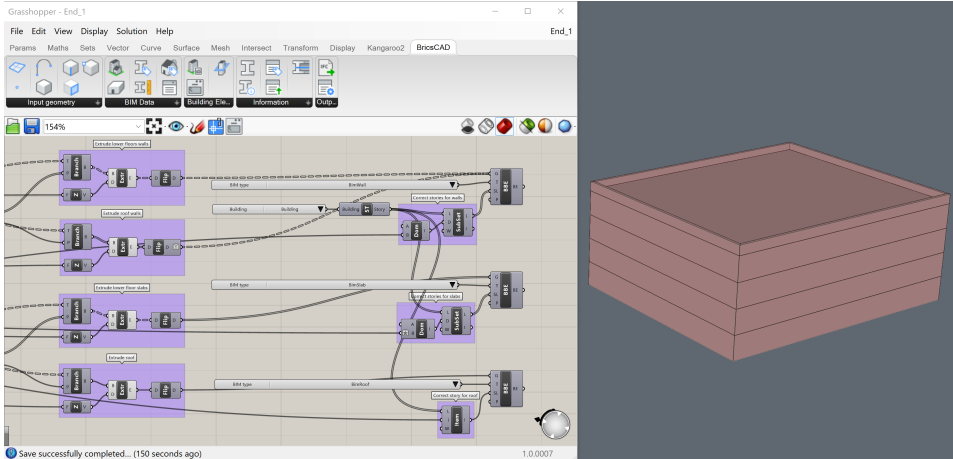


- 17.
18. Shift
- 19.



20. THCAD™
"End_1.dwg" End_1.dwg"Grasshopper" End_1.ghx"

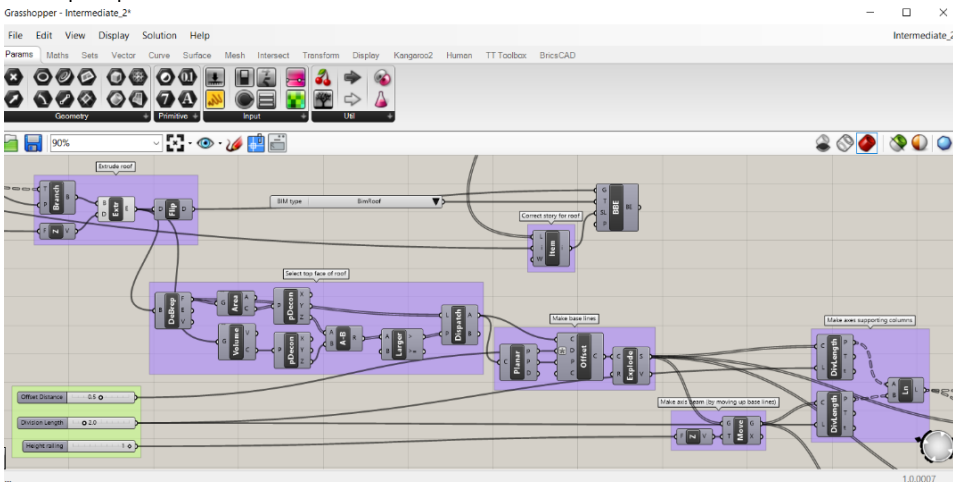
21. “End_1_Baked.dwg”



“End_1.dwg” “End_1.dwg” “Grasshopper” “End_1.ghx”

1. “Start_2.ghx” “Grasshopper”
 - zip
 - Grasshopper” > “...” “Start_2.ghx”
 - Ctrl + A “Grasshopper” Ctrl + C
 - Grasshopper “Start_2
 - Grasshopper “End_1.ghx”
 - Ctrl + V “Start_2.ghx”

2. “Brep” “Brep”

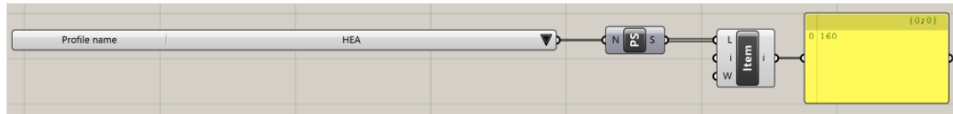


3.
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 - There is still a profile required, however, to complete this step and the following one. We will, therefore, create a profile from step 6 onward.
 - With that profile and the axes, the beams and supporting columns are made as extrusions.
4. The intermediate result is found in the 'Intermediate_2.ghx' and 'Intermediate_2.dwg' files. (Located in the zip file at the bottom of this page.)
5. (Optional) Skip the 'Select top face of roof'-group and replace it with a **THCAD > Input geometry > Face component**. Set to the top face of the roof slab in your THCAD baked building. (Do this by right-clicking on the component, click on 'Set one THCAD face' and select the face in the THCAD drawing). Connect this Face component with a **Params > Geometry > Surface component** and connect this surface to the correct inputs.
6. Go to **THCAD > BIM Data**.
 Drag the **Profile Names** and the **Profile Sizes** components onto the canvas.

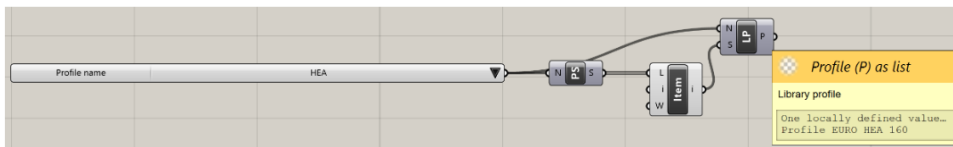
7. Select 'HEA' from the dropdown in Profile Names. This dropdown displays all the names of the profiles in the Profile Library of THCAD.
8. Link the component to the input ProfileName of the Profile Sizes component.



9. Link the Profile Sizes component to the input node 'List' in a **Sets > List > List Item component**, where i is set to '4' (right-click on the i input and 'Set integer' to 4). This List Item lets you pick one size from the list with all available profile sizes for the Profile Name linked to it.
Note: If you link a **Params > Input > Panel component** to the Profile Sizes output, you will see that the index 4 stands for size 160.



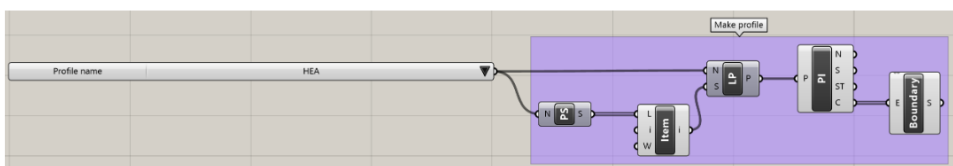
Link the Profile Names and List Item components to the **THCAD > Information > Library Profile component**, to get an HEA 160 profile as an output.



10. To get the curves that make up this profile, attach a **THCAD > Information > Profile Info component** to the Library Profile. One of the outputs created is the Profile Curves as tree.
11. Attach a **Surface > Freeform > Boundary Surfaces component** to the Profile Curves output node. This is to later extrude the surface as a solid, instead of the lines as a surface.



12. To group together the components just created, select them (with a selection box) and right-click on 'Group'.
13. **(Optional)** To rename the group, right-click on the purple rectangle. Rename the group in the upper text box, e.g. to 'Make profile'.



14. The Boundary Surfaces component should now be linked to the Content input of the Bounding Box component of the 'Calculate half of height of beam'-group. The Boundary Surfaces component should also be linked to the two Profile inputs of the Extrude components in the groups 'Make supporting columns' and 'Make beams'. The extrusions should now show you a railing with HEA 160 beams and columns.

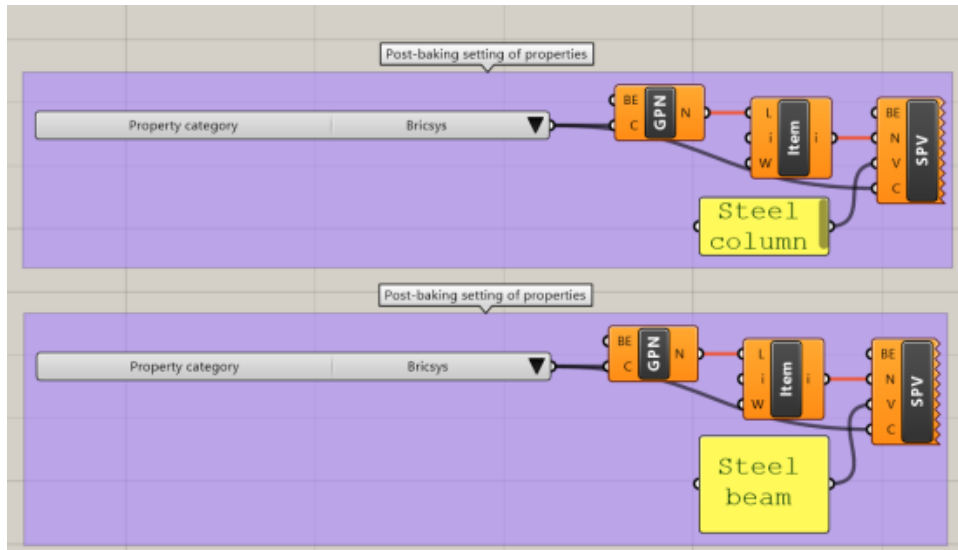


15. To bake those beams and columns into THCAD attach two **THCAD > Building Elements > Bake Building Element components** to the Grasshopper canvas.
16. 758pxDo the following:
 - Set the Geometry input to the extrusions.
 - Set the Element Type input to a **THCAD > BIM Data > BIM Types component**, which is set to BimColumn for the column extrusions and to BimBeam for the beam extrusions.
 - Set the Spatial Location input to the same as the roof.
 - Set the Profiles input to the Library Profiles component from the 'Make profile'-group.
17. You now successfully created a railing on top of your building. (The full script to do this is in the 'End_2.glx' file at the bottom of this page, which is linked to the 'End_2.dwg'.)
18. Bake into THCAD. The profiles are now set to the one in the Grasshopper script. You can still modify the connections of the beams in the corners by using L-Connect in THCAD. (To see the finished building with the railing on top of it, check out the 'End_2_baked.dwg' file at the bottom of this page.)

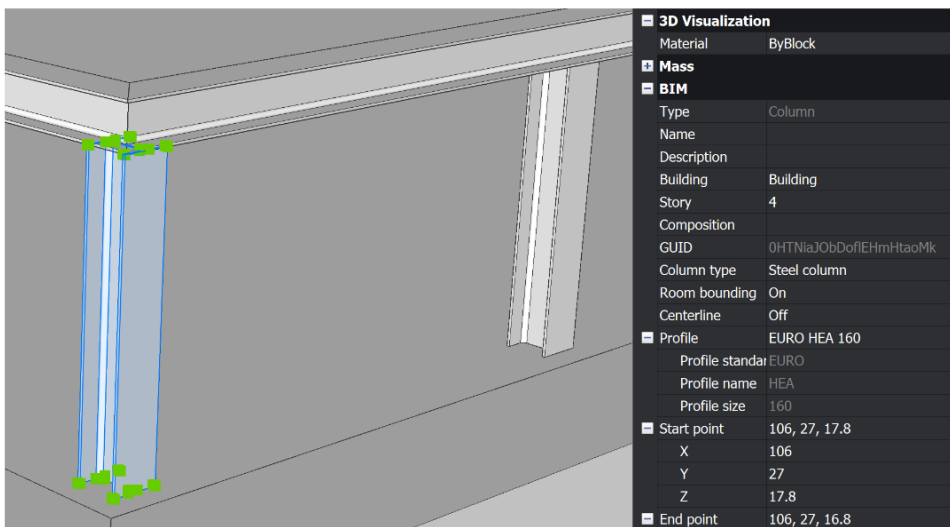
Procedure: Add information to a baked model

We will continue with the building made in the previous procedure. So open the 'End_2.dwg' and then open the Grasshopper file 'End_2.ghx' that is linked to the 'End_2.dwg'.

1. Add the 'Start_3.ghx' code to the canvas.
 - You do that by downloading the zip file at the bottom of this page and extracting its content.
 - Then open the 'Start_3.ghx' file by going to **File > Open Document...** in your Grasshopper window.
 - You can now select all of the Grasshopper code by hitting **Ctrl+A** on the keyboard and copy it using **Ctrl+C**.
 - Then switch back to the document you were working on in the previous procedure by going to the upper right corner of the Grasshopper window and clicking on the title of the current document (Start_3).
 - You then get a drop-down of all the active Grasshopper scripts, so open 'End_2.ghx'.
 - Now click on the canvas and hit **Ctrl+V** to paste the 'Start_3.ghx'-code.



2. This code has some post-baking settings of classified and baked beams and columns:
 - The script uses the **Get Properties Names** component to display the BIM properties in the **Property Category** '.
 - In those properties, it selects item 1 for the columns and item 0 for the beams, 'ColumnType' and 'BeamType' respectively.
 - To conclude, it sets the properties to the value specified in the **Panel** components, using the **Set Property Value** components.
3. To make the script work, bake the two **Bake Building Element** components that make up the railing.
4. Now link the Building Element output of the **Bake Building Element** components to the respective Building Element input of the **Get Properties Names** components.
5. `THCADColumnType""THCAD`
6. `THCADColumnType""THCAD`
7. " End_3.ghx"zip" End_3.dwg"



GrasshopperTHCAD

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