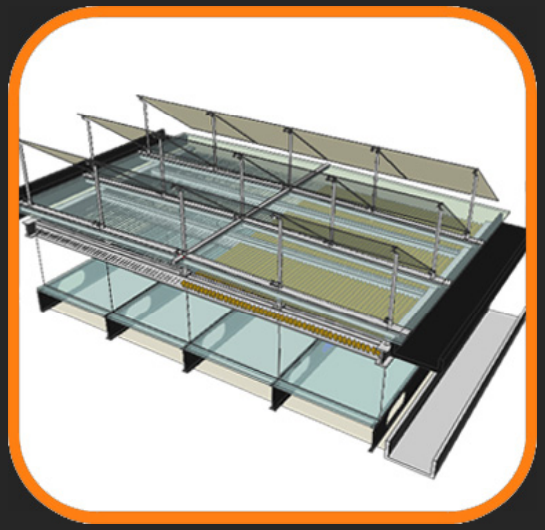
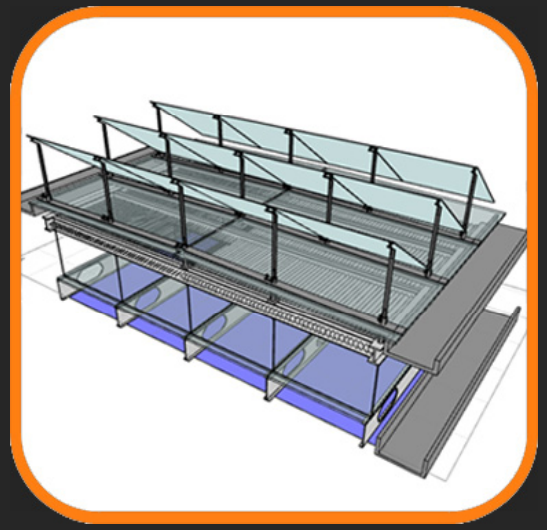
Harvard University
Graduate School of Design

version: 3/6/2009

From Rhinoceros to Ecotect

A SHORT TUTORIAL





Tiffany Otis | Christoph Reinhart
Harvard Graduate School of Design

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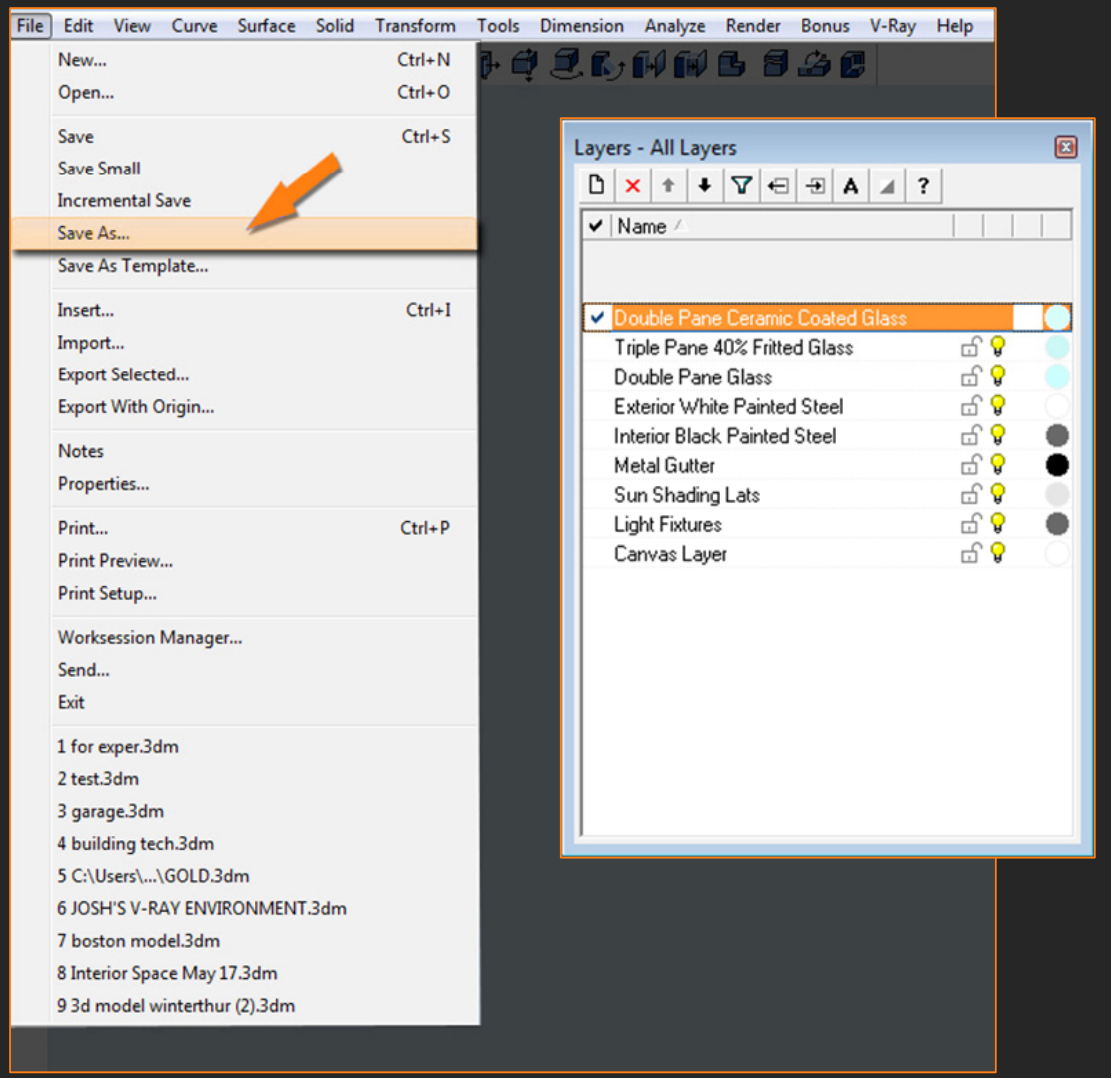
RHINO → ECOTECT

In Rhino:

- Before exporting, organize materials on separate layers according to their optical properties.

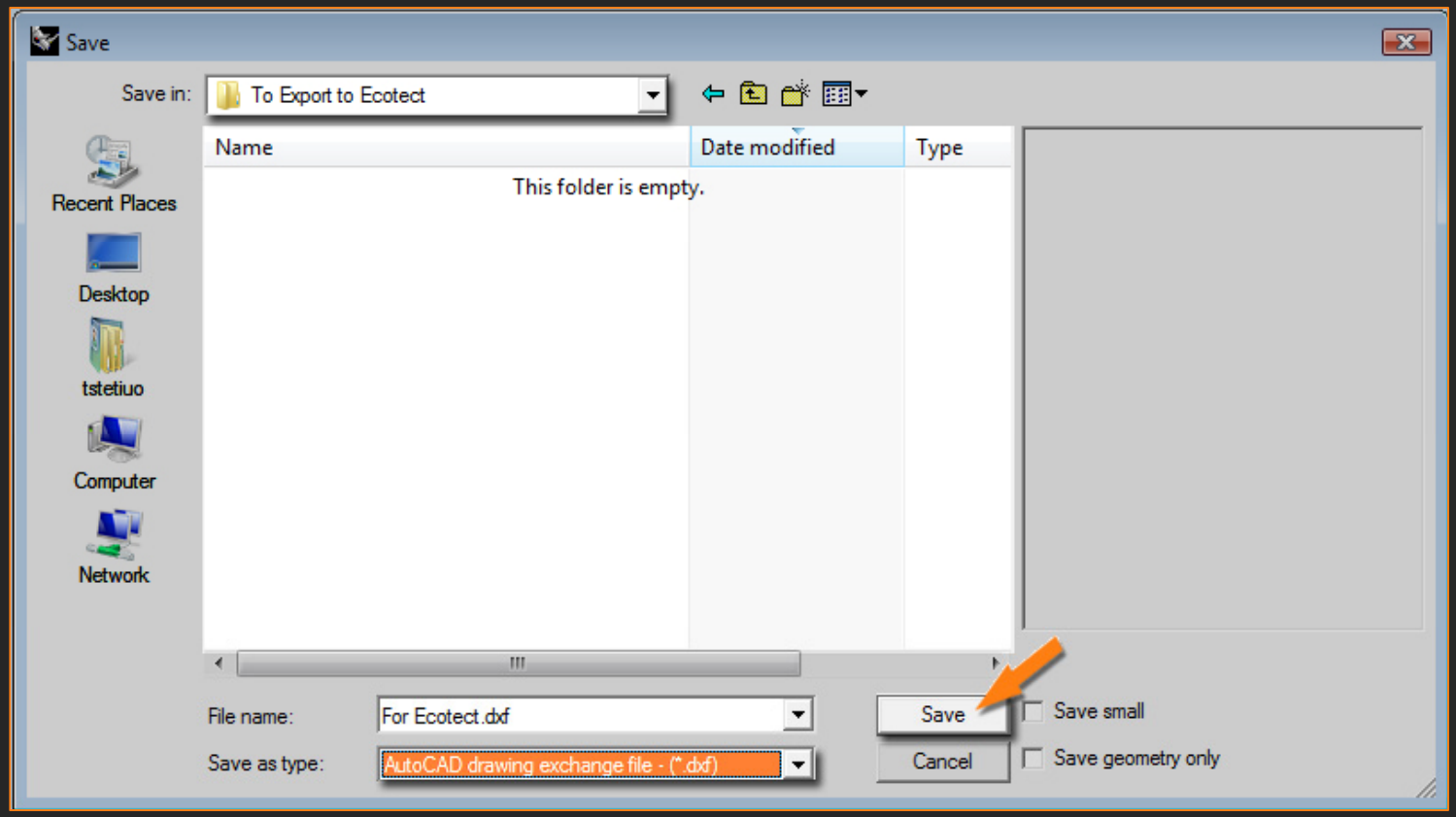
  This includes distinguishing between different types of glazing (single, double, triple, etc) and paint finishes (colour, matte, glossy, etc).

- Select:
  File → Save As…



RHINO → ECOTECT

- Choose “AutoCAD (*.dxf)” file format and save.



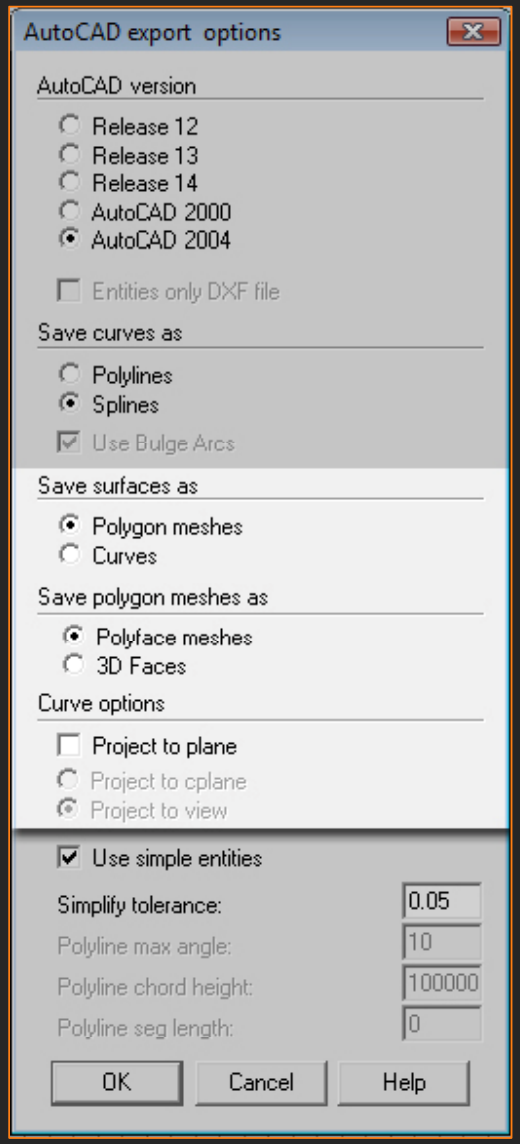
RHINO → ECOTECT

In the dialog box that appears:

- Select “Polygon meshes” and “Polyface meshes”
  (These options ensure that the model will be composed of surfaces as opposed to being a wireframe model)

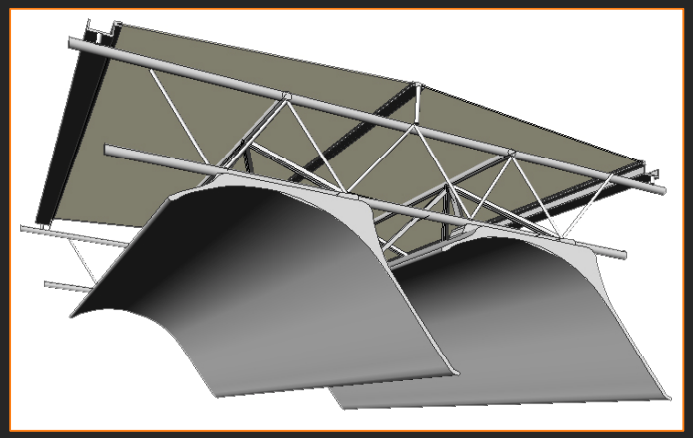
- Deselect “Project to plane”
  (If this option is left on, the file will be saved as a 2D model)

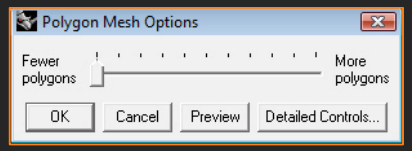
- All other options can be left at their default values.

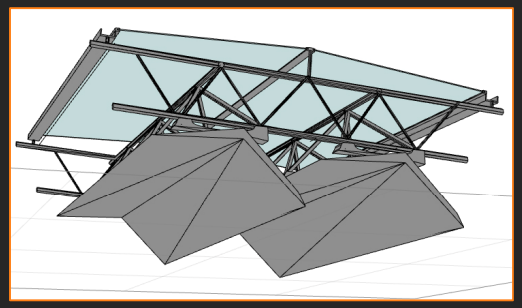


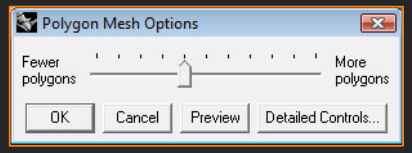
RHINO → ECOTECT

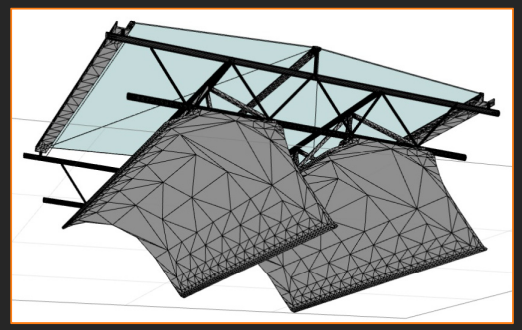
- When prompted for polygon mesh options, the slider should remain completely to the left. Unless precise geometry is essential for proper calculations.











In this example, accurate modeling of the curved leaf is required to understand how it reflects light down into the space, and the slider is accordingly adjusted to the right.

INFO

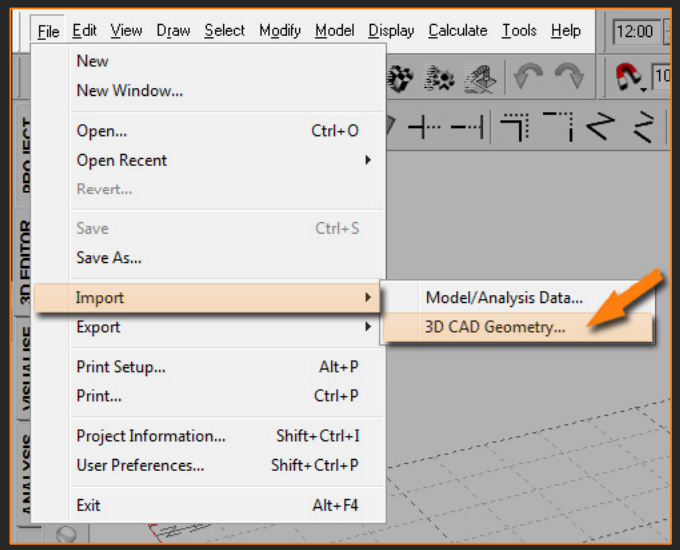
Note that the more complex the polygon mesh applied to the model, the longer it will take to save and to subsequently load into Ecotect.

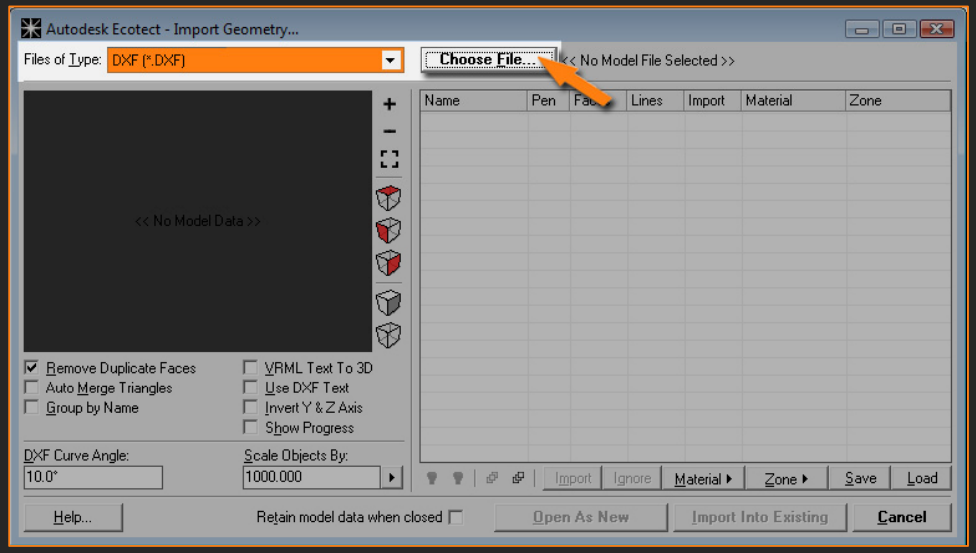
RHINO → ECOTECT

In Ecotect:

- Select: File → Import → 3D CAD Geometry…

- Select 'DXF (*.DXF)' from the dropdown menu and then choose the saved rhino file.



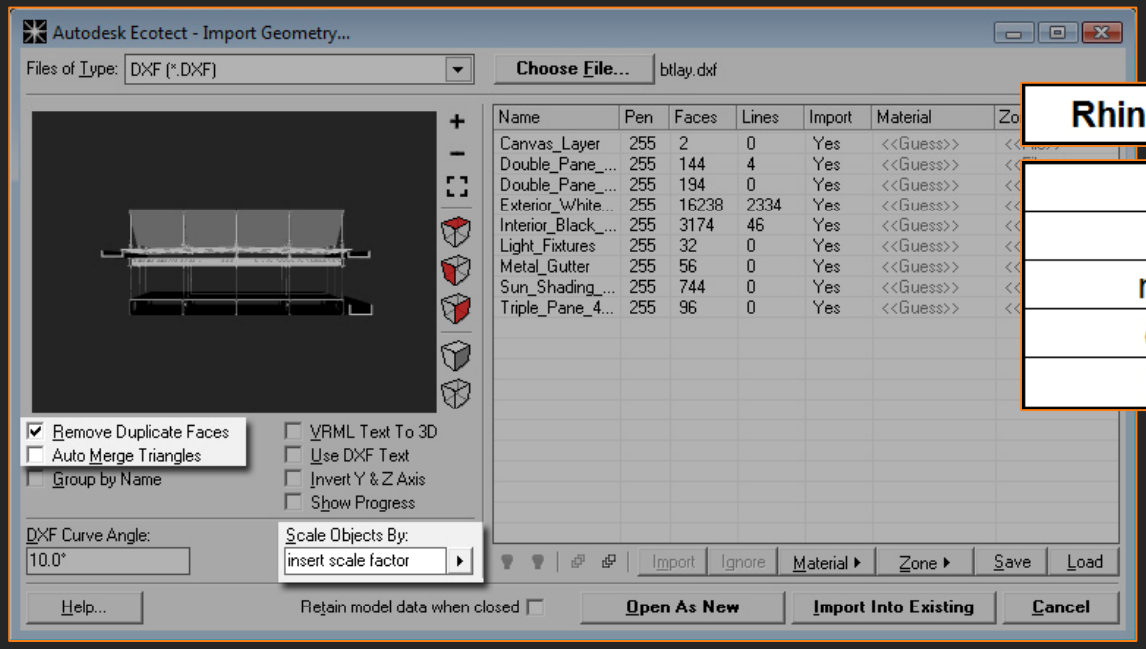


INFO

Caution: Selecting File → Open will lead to a dialog box with less options.

RHINO → ECOTECT

- Leave ‘remove duplicate faces’ checked.
- Uncheck ‘auto merge triangles’ as this operation will significantly slow down the import process, and is better performed at a later time.
- Ecotect calculates in mm and therefore in ‘scale objects by’ insert a scale factor to obtain a model where 1unit = 1mm.



Rhino Units	Scale Factor
ft	304.8
in	25.4
mm	1
cm	10
m	100

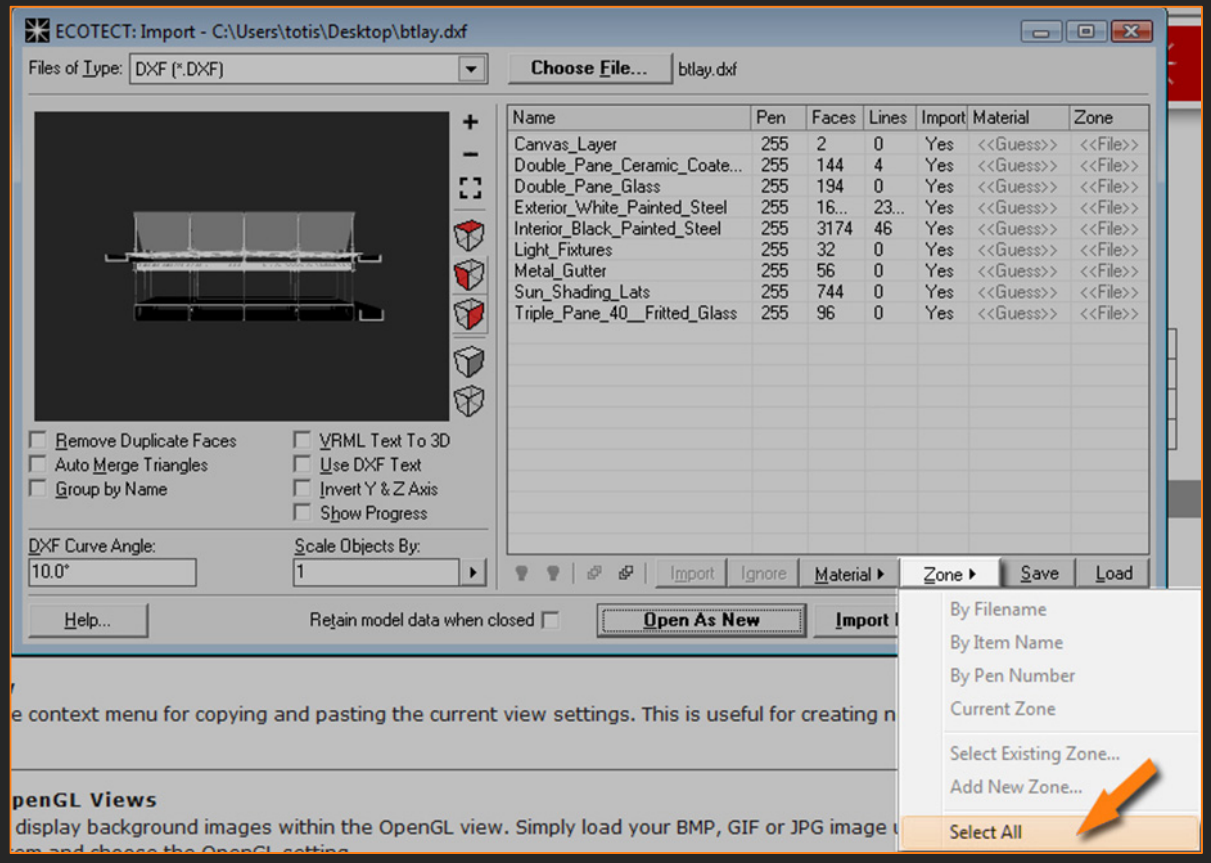
INFO

Merging coincident triangles is explained on slide 15.

RHINO → ECOTECT

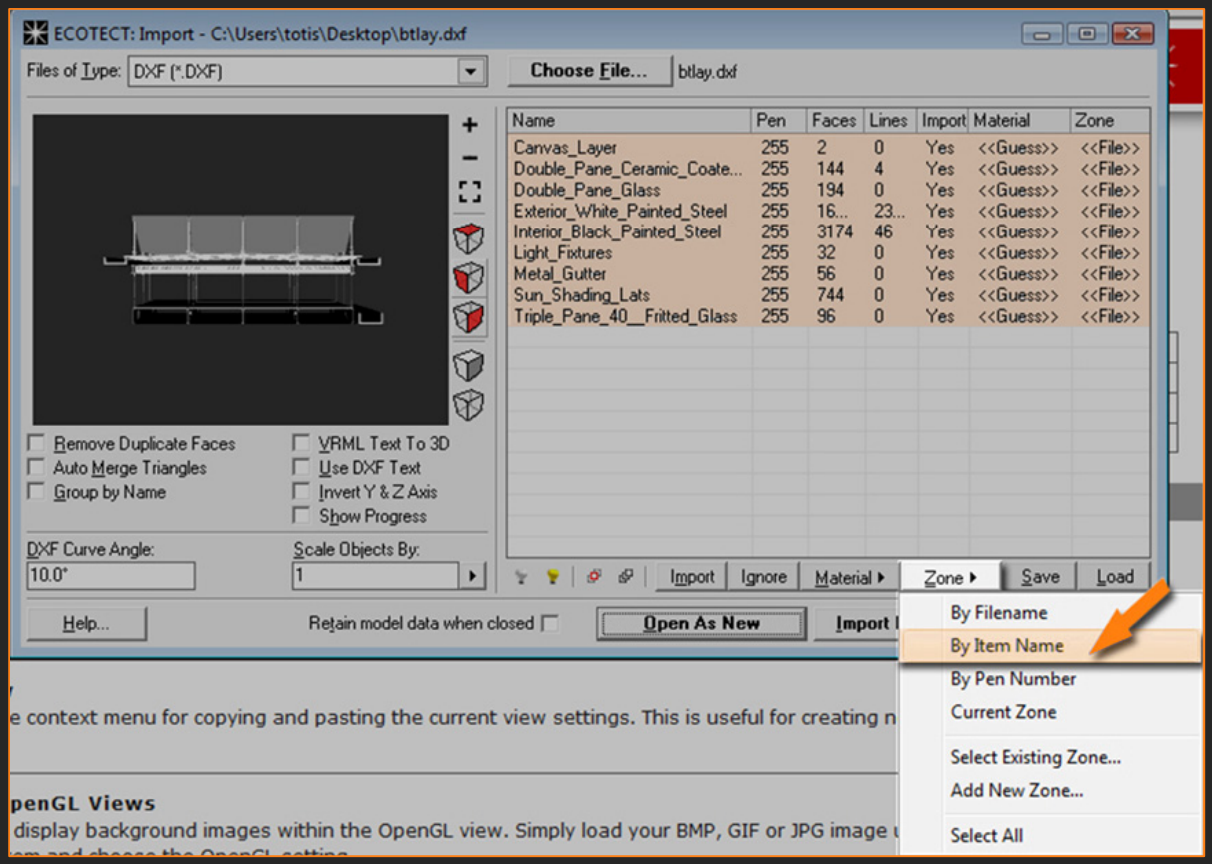
Assigning Rhino layers to separate zones:

- Choose: Zone → Select All to select all layers which were present in the Rhino model.



RHINO → ECOTECT

- With all layers now selected, choose: Zone → By Item Name to assign each Rhino layer to a separate zone.



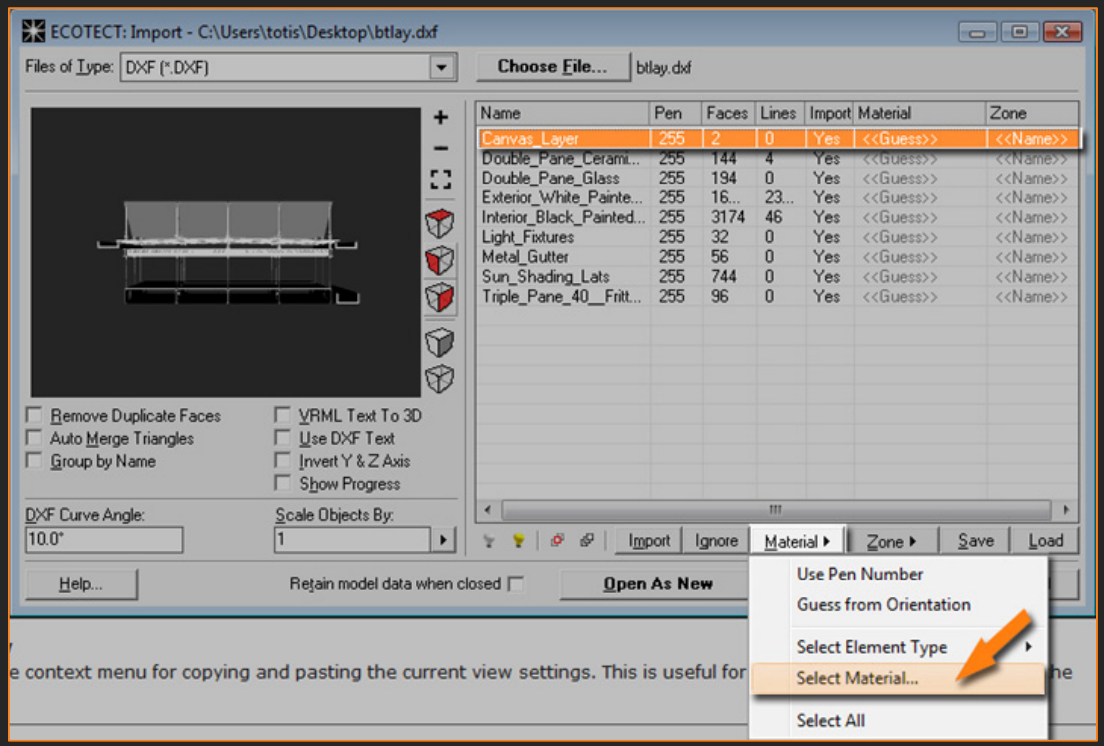
INFO

Zones are Ecotect's equivalent to layers.

RHINO → ECOTECT

To assign a specific material to each zone:

- Select a layer and choose Material → Select Material.

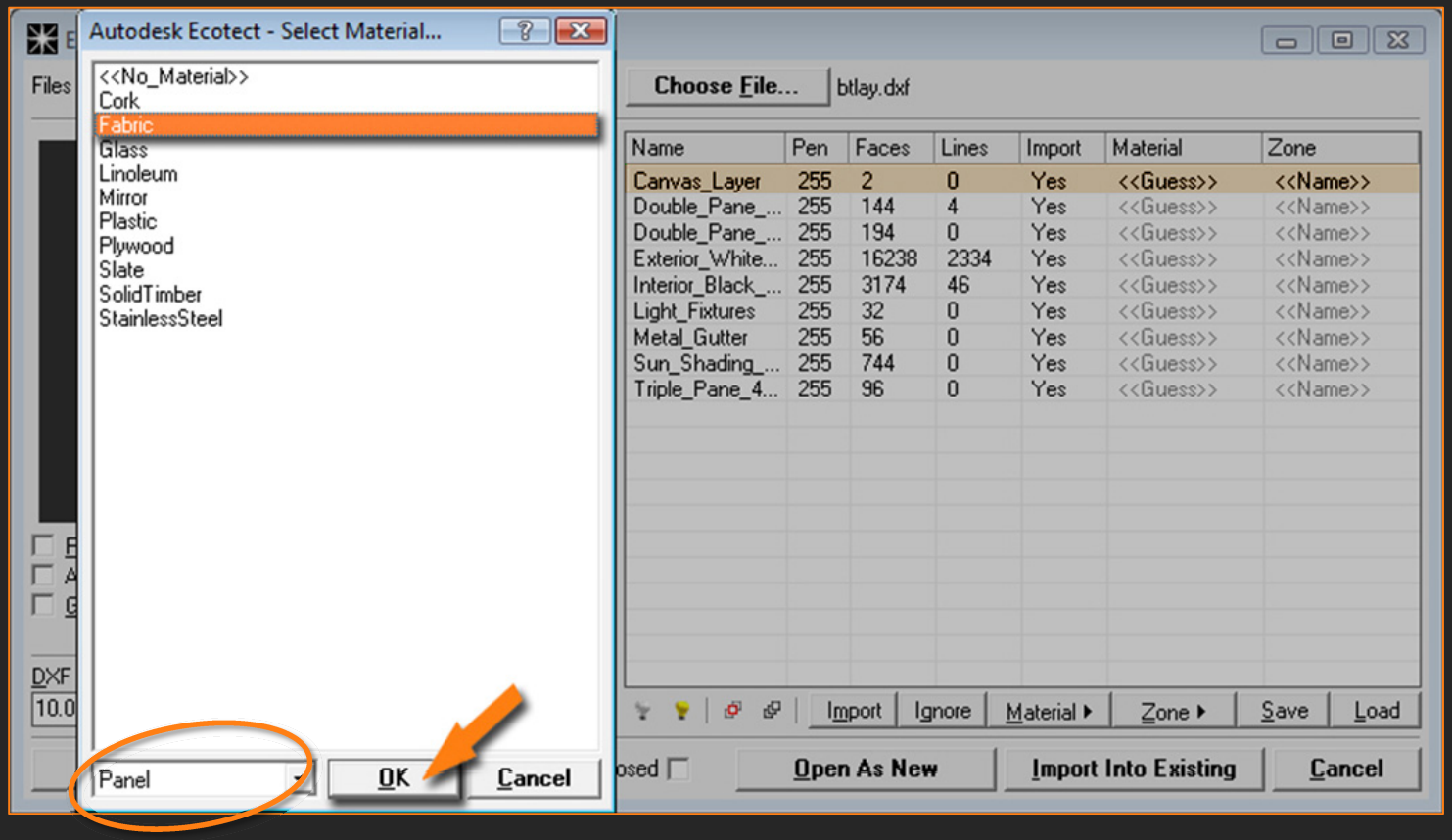


INFO

Note that if unsure of material properties, this step can be fully or partially skipped as materials can also be assigned and/or modified at a later time. This method is explained on slides 16-17.

RHINO → ECOTECT

- Select a category from the dropdown menu, and choose a material from the palette. Select ok.

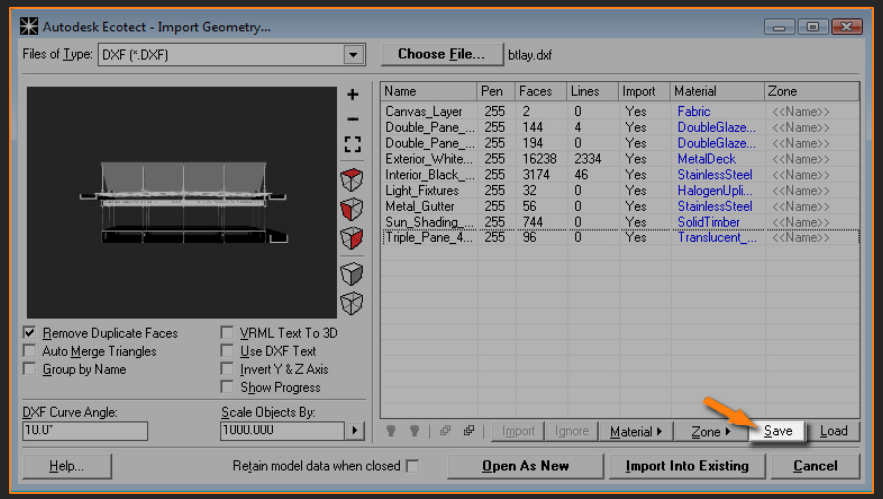


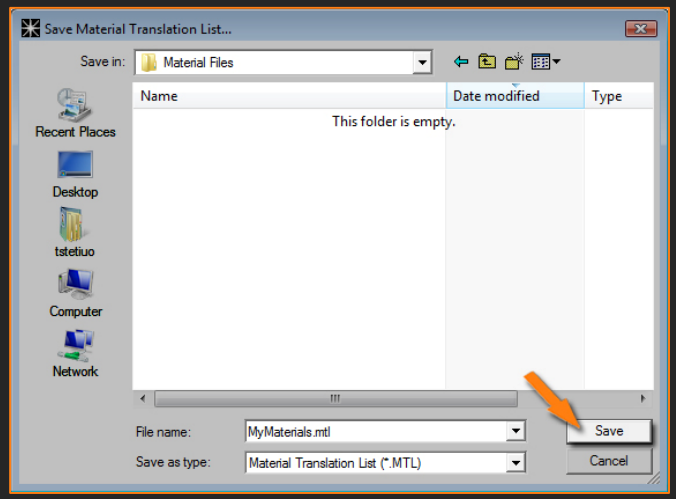
RHINO → ECOTECT

Saving a Material Translation List:

- If a Rhino file will be imported several times (for calculations on various iterations over the course of design work), material assignments can be saved in a file, and the task of assigning materials to zones individually can be bypassed on subsequent imports.

- Once materials have been assigned, click on ‘save’ to make an .MTL file (Material Translation List).

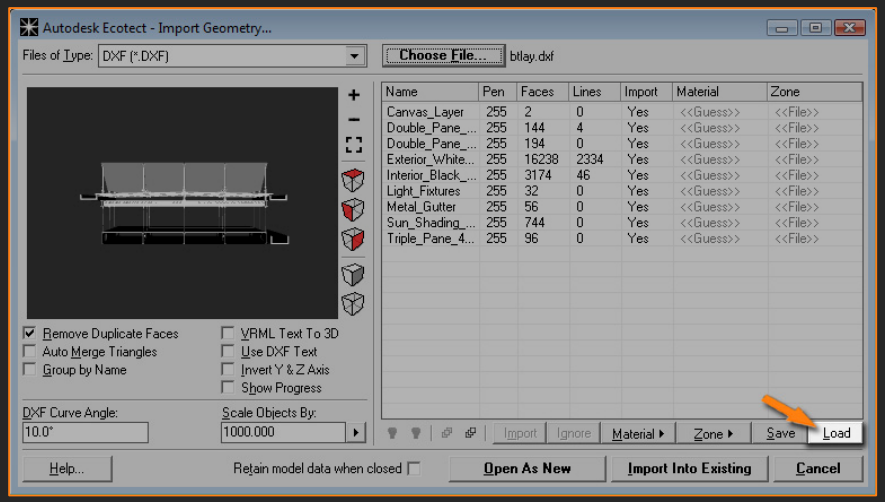


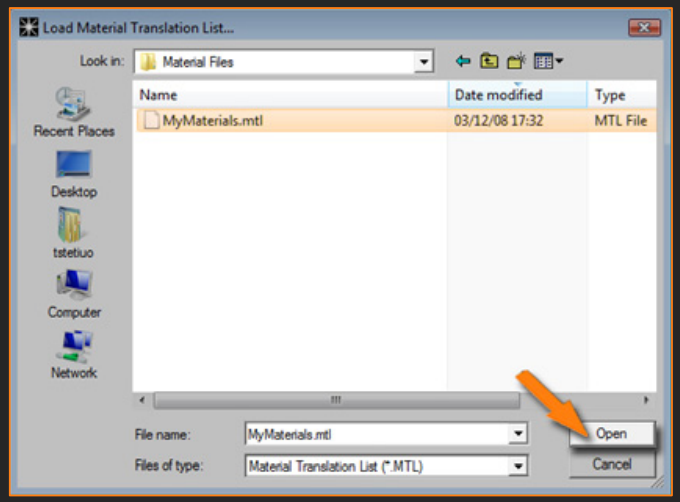


RHINO → ECOTECT

- When re-importing a model which has undergone changes, click on ‘load’ to select the .MTL file.

- Materials will then be assigned accordingly.



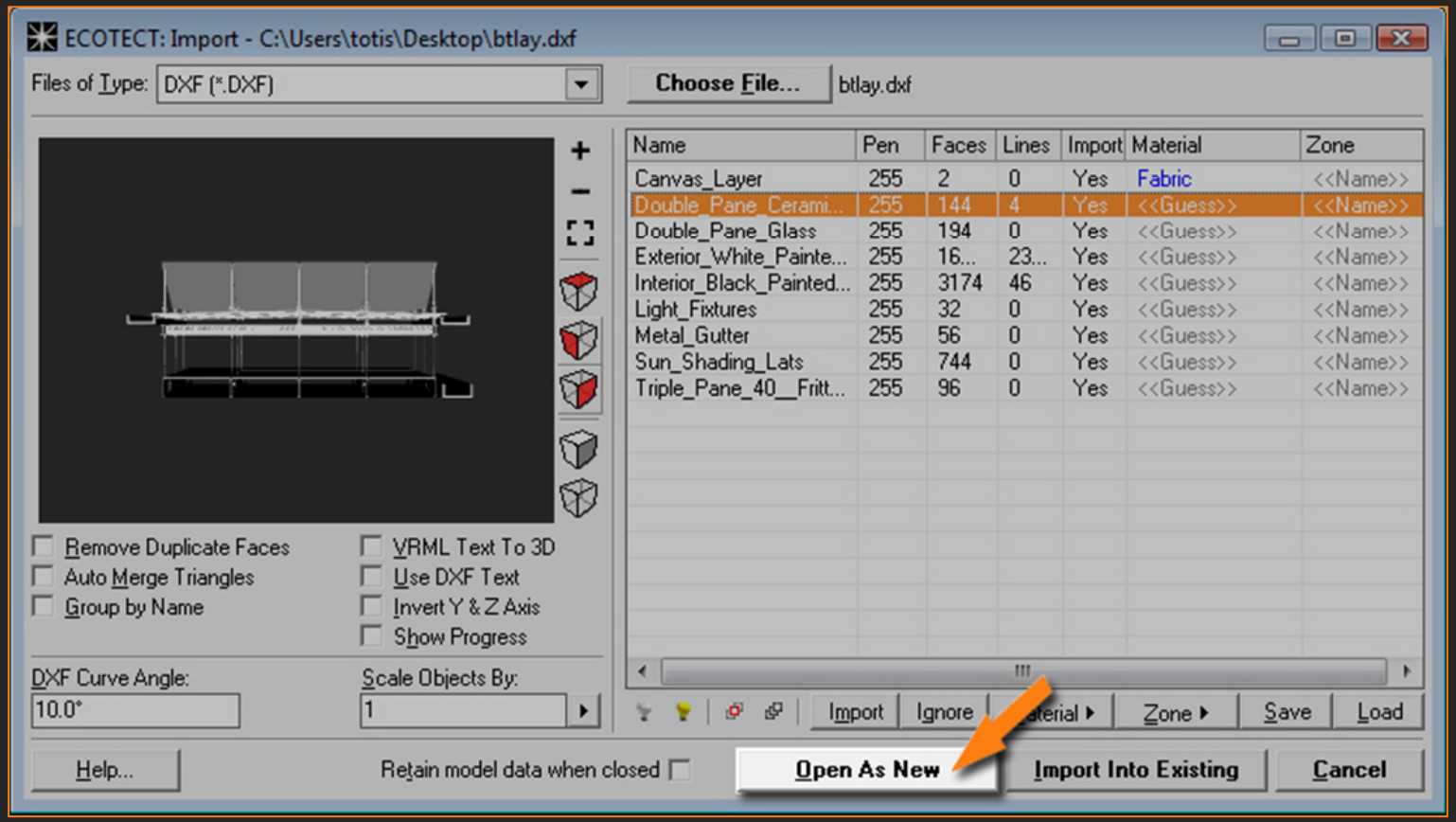


INFO

Materials will be assigned as long as layer names remain unchanged from when the .MTL file was originally saved. MTL files will work with new layers present, however these will not receive any material assignments.

RHINO → ECOTECT

- Once materials are assigned, select: Open As New



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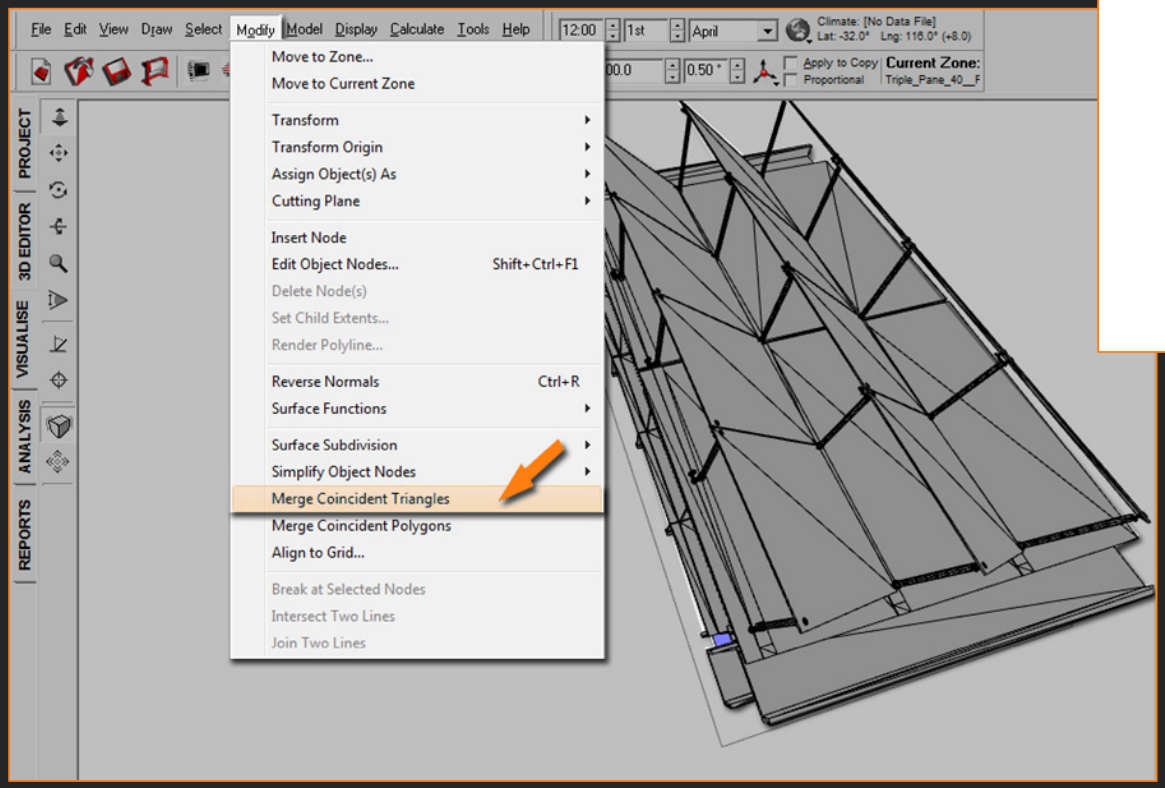
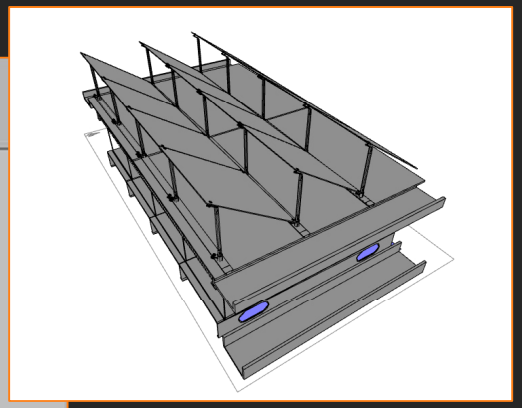
RHINO → ECOTECT

To remove triangulated faces after opening:

- If the imported model shows triangulated faces, these can be removed:
  Select the entire model and choose Modify → Merge Coincident Triangles.



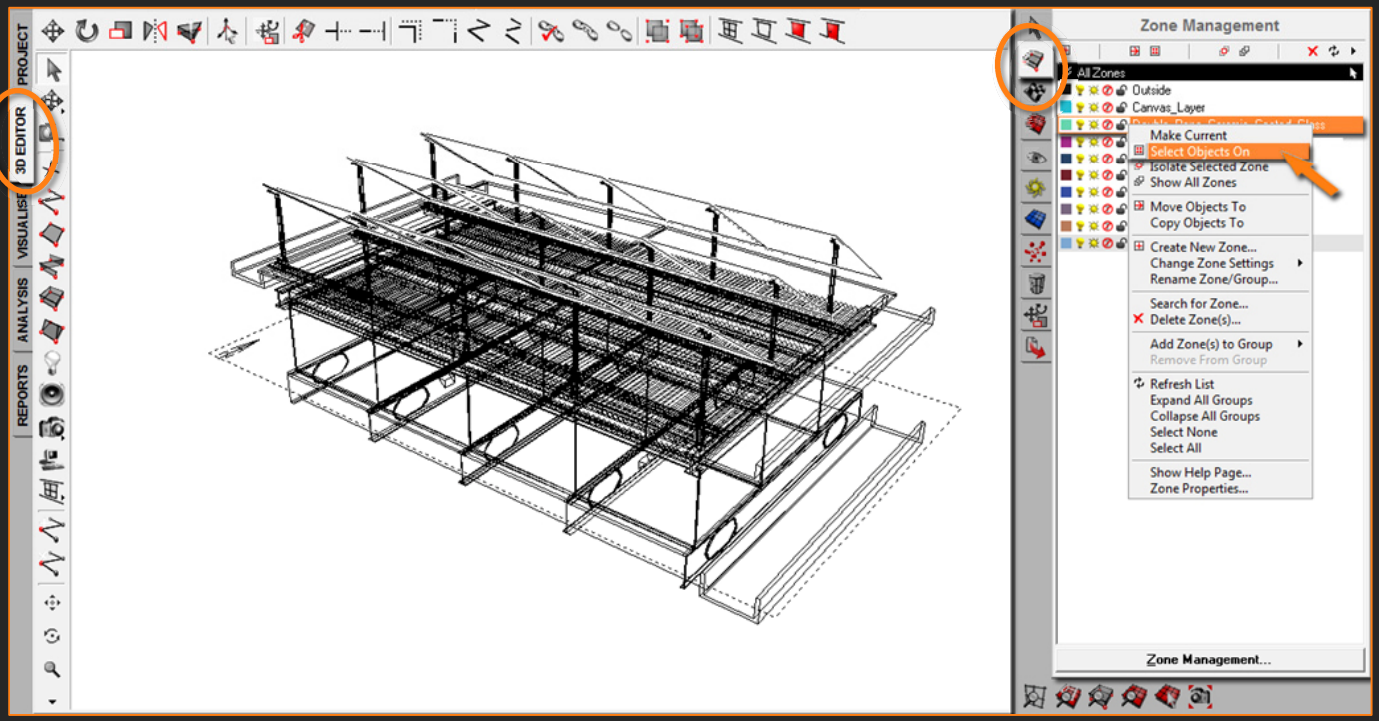


RHINO → ECOTECT

To assign materials after opening:

- With objects of the same material belonging to the same zone, materials can easily be assigned or changed:

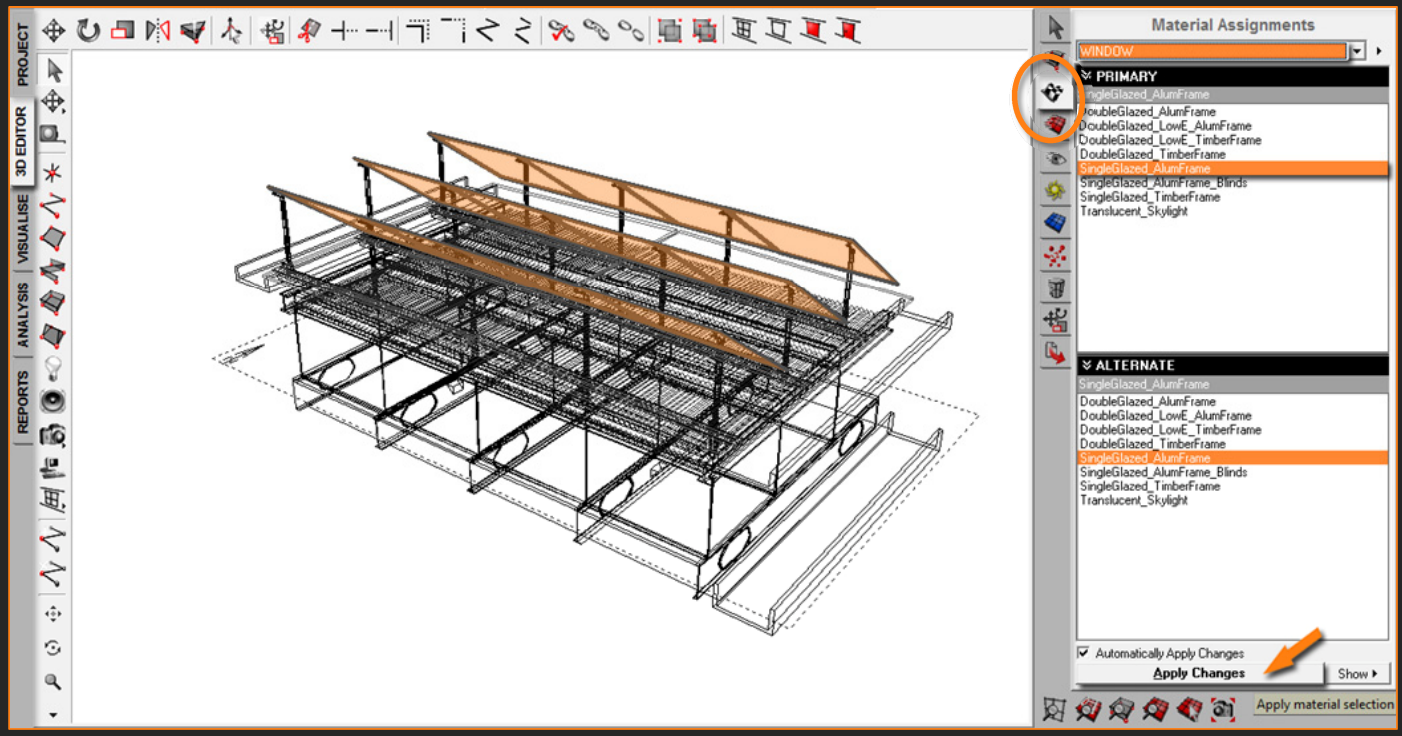
(1) Navigate to the 3D Editor tab.
(2) Choose the Zone Management tab in the right hand palette.
(3) Right click on a zone and chose "Select Objects On"



RHINO → ECOTECT

- With all objects belonging to this zone selected:

(1) Change to the Material Assignments tab in the right hand palette.
(2) Choose a material category from the dropdown menu, select an option.
(3) Click on 'Apply Changes' to confirm.



ACKNOWLEDGEMENTS

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The GSD has been putting special attention to the advancement of environmental building performance, supporting a number of researches in the matter. www.gsd.harvard.edu

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The Presidential Instructional Technology Fellows (PITFs) program was established to recruit and train fellows in conjunction with the Schools to work with faculty to develop digital course materials with immediate educational benefits. PITFs leverage existing software tools developed here at Harvard and provide outreach. www.provost.harvard.edu/funding