

Bose[®] Modeler[®]

Software Plugin for SketchUp[®]

Version 1.1

Contents

1. Introduction.....	4
1.1. About this document	4
1.2. What is the Modeler Software Plugin for SketchUp?	4
1.3. Licensing & Registration	5
1.4. Installation & De-installation	5
1.4.1. <i>Installation</i>	5
1.4.2. <i>Un-installing the Modeler Software Plugin for SketchUp</i>	8
1.5. Launching the Modeler Software Plugin for SketchUp.....	8
1.6. Getting Help.....	9
2. Setting up SketchUp for the Modeler Software Plugin for SketchUp.....	10
2.1. Units	10
3. The Modeler Software Plugin for SketchUp Menu Structure	12
4. Exporting to .MTF	13
4.1. Export warnings and errors	14
4.1.1. <i>Objects selected</i>	14
4.1.2. <i>Surfaces on non-standard layers</i>	15
4.1.3. <i>Different materials assigned</i>	16
5. Model Debugging Views.....	17
5.1. Show faces on non-standard layers	17
5.2. Show faces with holes.....	18
5.3. Show faces without material assigned.....	19
5.4. Show faces with different materials on front and back side assigned	19
6. Model Material Browser.....	21
6.1. Selecting materials for use	22
6.2. Creating new materials	23
6.3. Editing Absorption coefficients	23
6.4. Delete unused materials	24
6.5. Delete unused components.....	24
7. Material Database Browser	26

7.1.	Read .mat-file.....	27
7.2.	Read all .mat files	29
7.3.	Clear database.....	29
7.4.	Duplicate loading of files and materials	30
7.5.	Color handling for imported materials.....	30
7.6.	Layer Browser.....	31
7.7.	Add standard layers	31
7.8.	Delete unused layers	32
7.9.	Assigning Occupancy.....	32
8.	Preferences	34
9.	Modelling Tips.....	36
9.1.	Material Assignment.....	36
9.2.	Double-sided surfaces	37
9.2.1.	<i>Same materials on front and back</i>	<i>37</i>
9.2.2.	<i>Different materials on front and back.....</i>	<i>37</i>
9.3.	Common Errors.....	38
9.3.1.	<i>Surface-in-Surface problems and how to find them</i>	<i>38</i>
9.3.2.	<i>Modelling of interior objects.....</i>	<i>39</i>
9.3.3.	<i>Other problems and how to deal with them.....</i>	<i>40</i>
10.	The .mtf File Format.....	40

1. Introduction

1.1. About this document

This document is intended to explain the functions of the Modeler Software Plugin for SketchUp, which is an extension for SketchUp. The document provides some modelling tips which are specific to acoustic models. However, it is not a guide for using SketchUp itself. Please refer to the SketchUp Help or online tutorials.

1.2. What is the Modeler Software Plugin for SketchUp?

The Modeler Software Plugin for SketchUp is a [SketchUp](#) extension to export SketchUp models to [Bose Modeler](#) software acoustic models. It exports models generated within SketchUp to the Modeler Text Format with .mtf file extension. The Modeler Software Plugin for SketchUp is not stand-alone software, but runs as a plugin within SketchUp.

The Modeler Software Plugin for SketchUp introduces absorption coefficients into SketchUp. Materials can be imported from Bose Modeler software .mat-files, or coefficients can be assigned within the model.

Every surface is assigned a surface type as used in Bose Modeler software; Materials can be “specular” or “scattering” reflecting.

This data is saved *within the SketchUp model* (.skp), so there is no need to keep track of external files.

The plugin also has some integrated debugging functions for acoustic models.

The exported .mtf file includes surfaces with all necessary properties and can be directly used in Modeler for prediction. Components are not exported and must be exploded manually before export.

System requirements

The Modeler Software Plugin for SketchUp requires a Windows® PC with Windows 7 or 8.1.

SketchUp must be installed in Version 8 (maintenance release 2) or 2013, 2014 or 2015.

SketchUp 7 is not supported in Version 1.1; there is a legacy version of the Modeler Software Plugin for SketchUp available which supports Sketchup 7 an 8.

Both SketchUp versions “Make” and “Pro” are supported, but only the pro versions of SketchUp will let you import DWG/ DXF as a modelling starting point.

It is recommended to use a wheel mouse with clickable wheel, since this makes navigation within the model much easier.

1.3. Licensing & Registration

The Modeler Software Plugin for SketchUp is freely distributed to users of Bose Modeler Software. No registration or hardware key is required to run the Modeler Software Plugin for SketchUp in SketchUp.

1.4. Installation & De-installation

1.4.1. Installation

To install the Bose Modeler Software Plugin for SketchUp, simply download the provided installation file “Bose Modeler SketchUp Plugin 1.x installer.rbz”.

The installer is an archive containing all necessary files. The *.rbz file must be loaded in Sketchup to copy the plugin into the corresponding SketchUp directories. SketchUp will set the installation path automatically; this is depending on your window installation (Username). Refer also chapter 1.4.2.

Open the “Preferences” dialog in SketchUp:

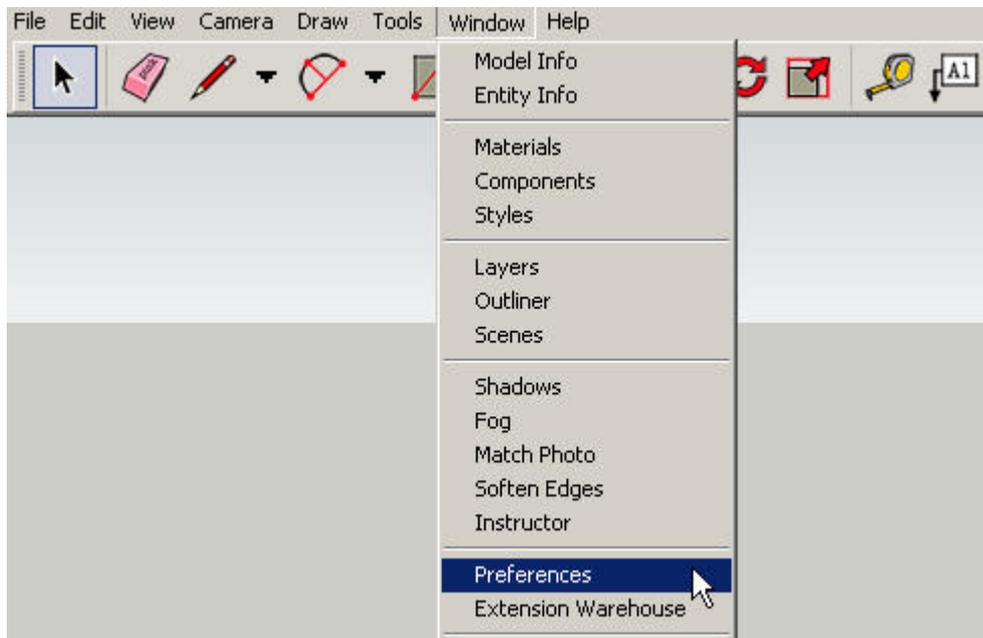


Figure 1: open Preferences dialog in SketchUp

Choose “Extensions” Dialog and press “Install Extension...”....

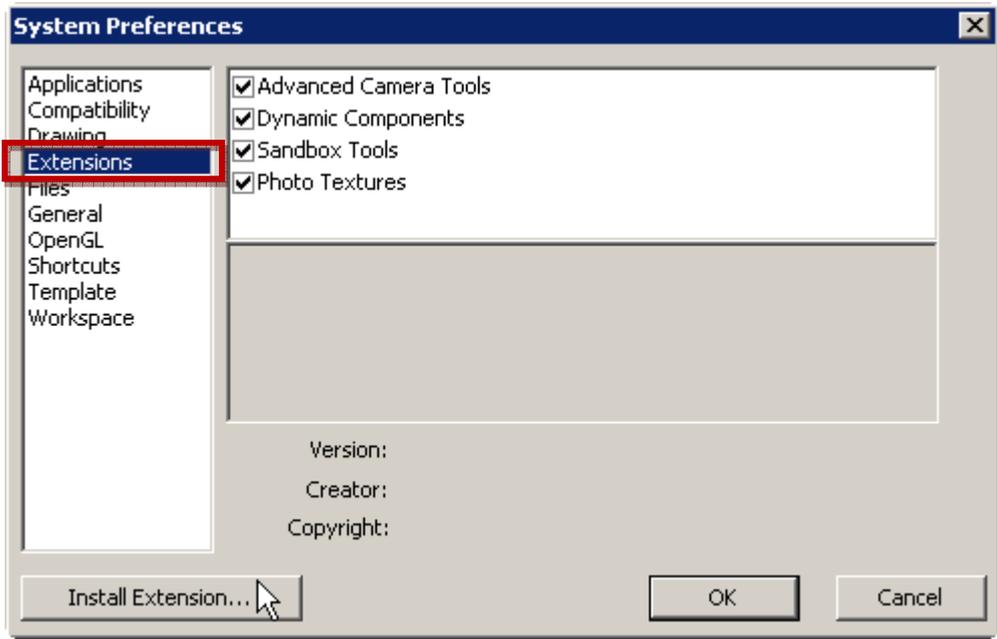


Figure 2: Open the “Extensions” dialog and search the downloaded installer file.

...search the downloaded installer file “Bose Modeler SketchUp Plugin 1.x installer.rbz” on your harddrive, select and press “Open”.

The following security warning informs you that the installation routine needs permission to write to the file system. Click “Yes” to continue, this will start the installation.

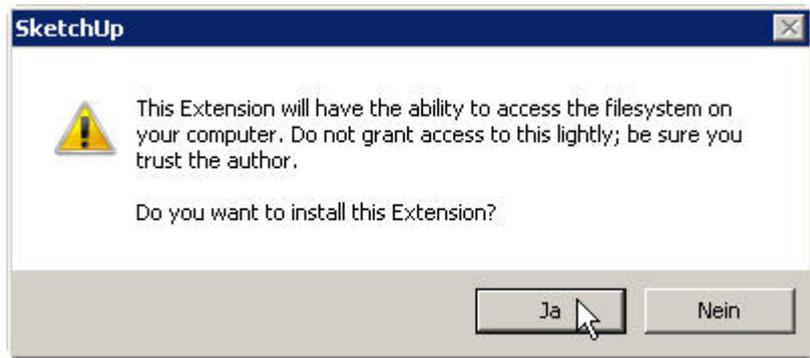


Figure 3: Security dialog

Installation completed!

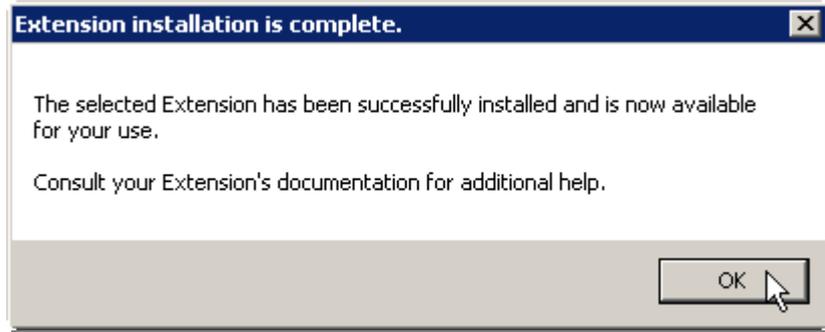


Figure 4: Installation completed!

Click "OK" and you will see the preferences dialog again.

You can control if the Bose Modeler Software Plugin is activated in SketchUp:

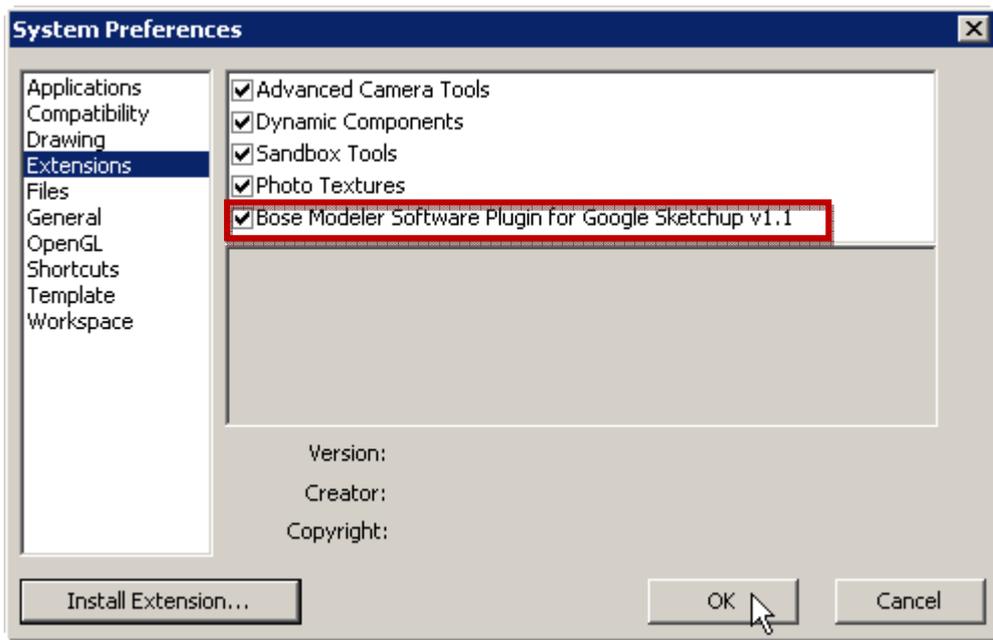


Figure 5: Bose Modeler Software Plugin activated.

Tick the square beside the entry "Bose Modeler Software Plugin..." if not activated yet.

Bose Modeler Software Plugin is now ready to use. You should see the following new icon set in the top menu bar:



1.4.2. Un-installing the Modeler Software Plugin for SketchUp

You can disable the Modeler Software Plugin for SketchUp in the Plugins Menu of Sketchup if you want to keep it, but don't want to see the buttons while using Sketchup (see Section 2.1). Should you want to remove the Modeler Software Plugin for SketchUp, you can simply remove the necessary files from your SketchUp Tools Folder.

There is no uninstaller routine for the Modeler Software Plugin for SketchUp. The installer simply writes all necessary files into the corresponding directory.

If you want to remove the Modeler Software Plugin for SketchUp, go to the following folder in your system:

**C:\Users\USERNAME\AppData\Roaming\SketchUp\SketchUp
201X\SketchUp\Plugins**

Then remove the subfolder "su2modeler" and the file "su2modeler.rbs". There will be absolutely nothing left on your PC from the Modeler Software Plugin for SketchUp.

Note:

To have access to the "C:\Users\USERNAME\AppData" folder, you may need administrator rights and you have to enable "show hidden system files" in the folder options of Windows.

1.5. Launching the Modeler Software Plugin for SketchUp

If correctly installed, the Modeler Software Plugin for SketchUp will be automatically loaded during startup of SketchUp.

The following buttons will appear in your SketchUp toolbar:



Figure 6: The Modeler Software Plugin for SketchUp Toolbar Buttons

If you can see these buttons, the Modeler Software Plugin for SketchUp is correctly installed.

1.6. Getting Help

Help is provided by means of this pdf. It can be accessed by either clicking the “Help” button located on the right end of the button toolbar for the Modeler Software Plugin for SketchUp which is loaded at startup:



Figure 7: Help button

Or, (as any function of the Modeler Software Plugin for SketchUp), it is also accessible via the “Plugins” Menu of SketchUp:

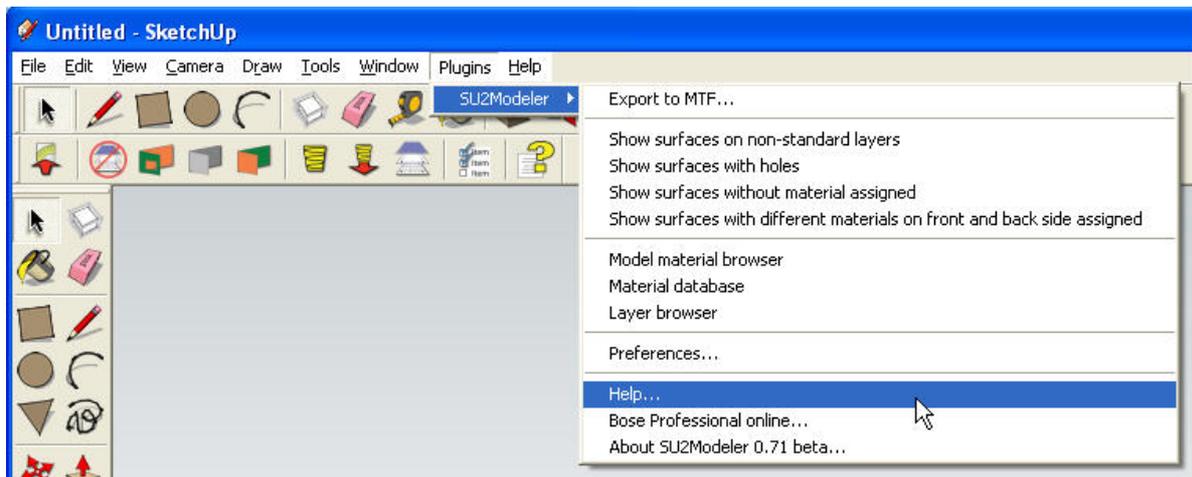


Figure 8: Accessing this SU2Modeler Help document via the plugins pull-down menu.

Note that you will not find help for the Modeler Software Plugin for SketchUp in the SketchUp Help Menu, but all functions for extensions are found in the “plugins” menu of SketchUp, as shown above.

2. Setting up SketchUp for the Modeler Software Plugin for SketchUp

Before you start using the Modeler Software Plugin for SketchUp, you should check some settings in SketchUp first:

2.1. Units

To prepare SketchUp for acoustic modelling, you should first enable the length snapping and enter a reasonably small step for snapping.

To get to the Units, select “Model Info” from the “Window” Menu and then select “Units”:

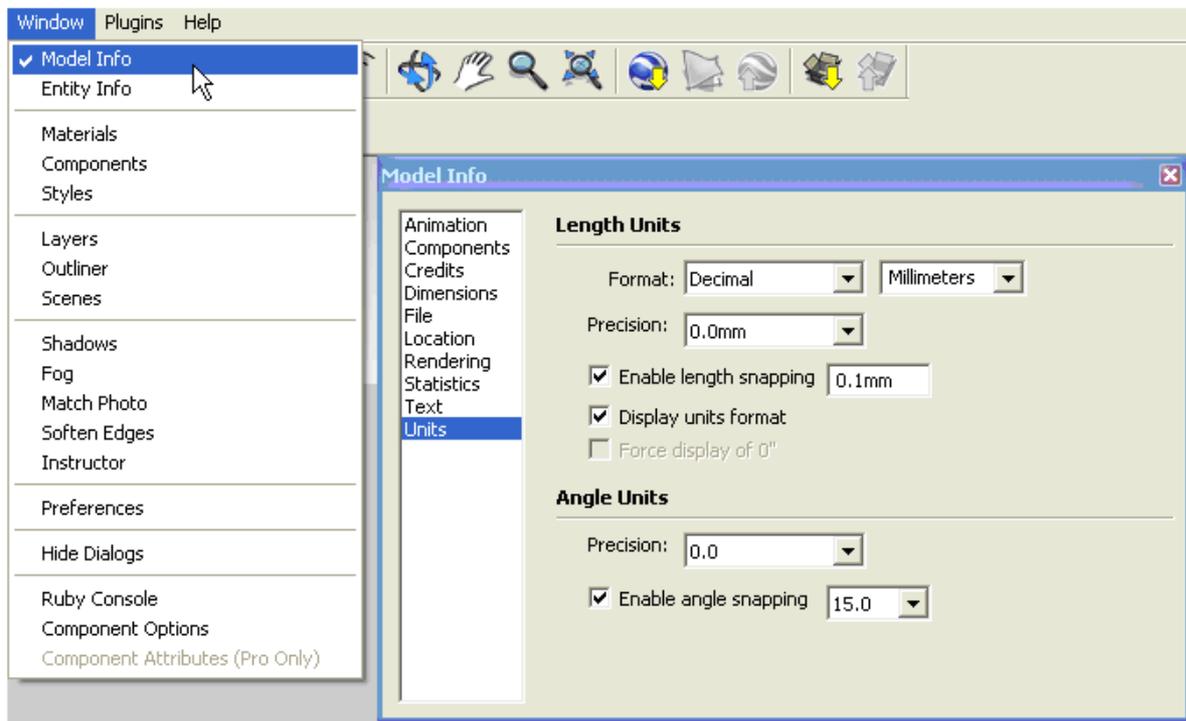


Figure 9: SketchUp Model Info Window “Units”

Tip: Set the unit (Meters, Centimeters, Millimeters, Inches, Feet) the same as used in your input (CAD) plans. This makes drawing much easier.

A step of 1 cm or even 10 cm for large models is reasonable for acoustic modelling. If length snapping is not enabled or the step for snapping is too small, errors during modelling are more likely to happen which are difficult to correct.

You can draw your SketchUp model in any unit you prefer, but before you export to MTF, make sure that your model is converted to metric units because the .MTF file assumes that the geometry is defined in metric units.

3. The Modeler Software Plugin for SketchUp Menu Structure

The menu structure for the Modeler Software Plugin for SketchUp is very simple; all dialogs and functions (with one exception of accessing the Bose website) can be accessed either via the button toolbar:



Figure 10: The Modeler Software Plugin for SketchUp Button Toolbar

Or, alternatively, the same functions can be accessed via the “Plugins” menu of SketchUp:

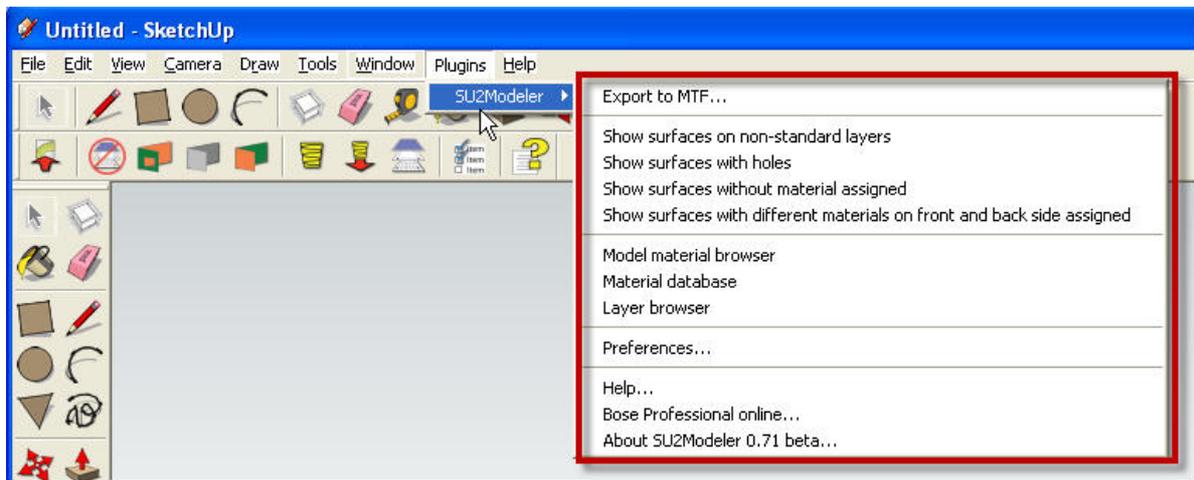


Figure 11: Accessing the Modeler Software Plugin for SketchUp functions from the "Plugins" menu of SketchUp

The buttons have exactly the same functions as the menu items.

4. Exporting to .MTF

The export function is the main function of the Modeler Software Plugin for SketchUp, and accessed by clicking the button with the Bose Modeler software Logo, or the pull-down menu. The button is only accessible if your current SketchUp model contains any surfaces at all, otherwise it will be grey and not able to be accessed.



Figure 12: Accessing the .mtf-export

Clicking this button will directly export your model to the Modeler Text Format (.mtf).

Under normal conditions, a standard Windows dialogue will show on your screen:

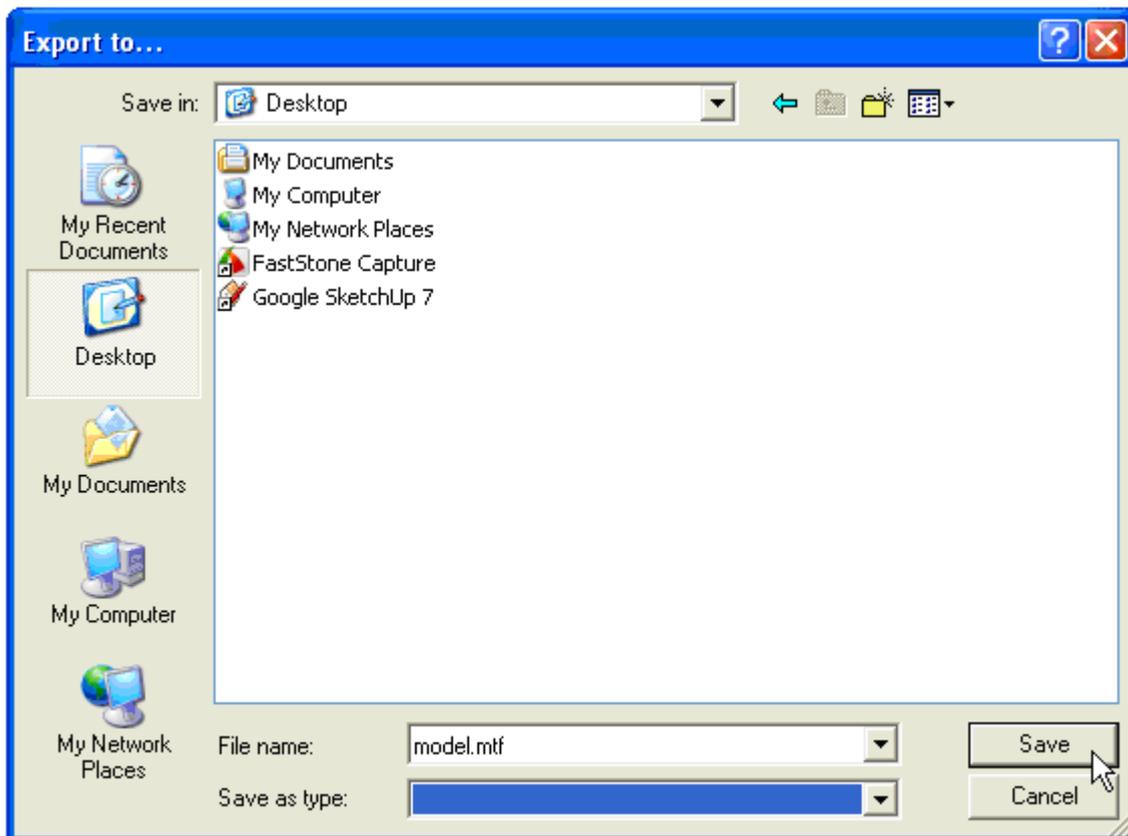


Figure 13: "Save to" dialogue

You can now choose the path where you want to store your exported model.

As a default, the Modeler Software Plugin for SketchUp will suggest the path where the model is stored. If you change the path to a different output folder, the Modeler Software Plugin for SketchUp will remember the path for the next export.

Note that it is not necessary to enter the file type ending .mtf even if you change the filename.

The selected .mtf file is written to the desired directory and contains all information necessary for predictions in Modeler.

4.1. Export warnings and errors

In some cases, you will get a warning message when you export a model:

4.1.1. Objects selected

In SketchUp, objects are selected just by clicking on the object with the “Select” tool. In many cases, you may have accidentally selected a surface or a line in your model.

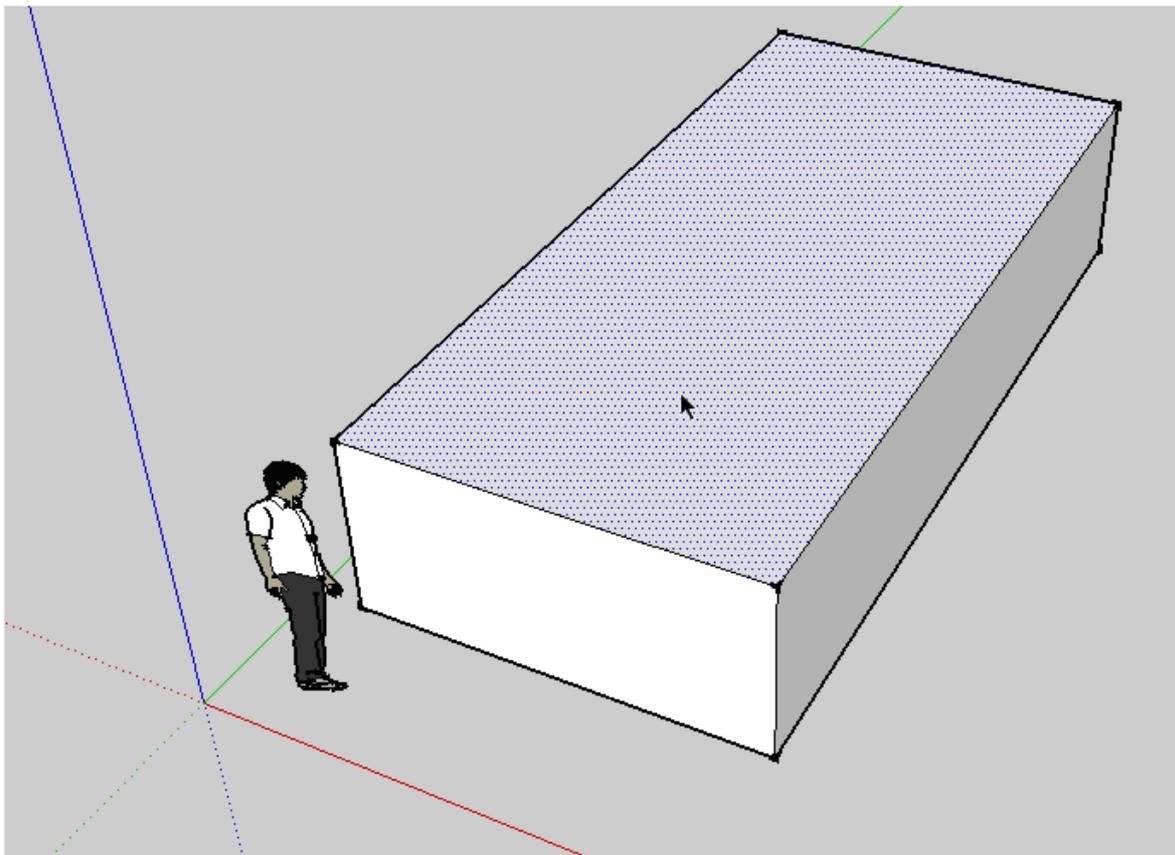


Figure 14: Selected top surface of a box.

In case you have selected *anything* in your model, the following message will appear when you attempt to export your model:



Figure 15: “Objects are selected” dialogue

The default choice is “yes”, and choosing this option, the complete model will be exported as a whole. If you select “no”, only the selected part of your model will be exported.

Since it is in most cases desired to export the whole model, you can just confirm this dialog by clicking “yes”.

4.1.2. Surfaces on non-standard layers

Bose Modeler software requires that all surfaces are assigned to a surface type. These surface types are assigned within SketchUp by layer (see also section about .mtf file format).

For example, if you have a surface in SketchUp on a layer called “Floor”, the surface will be assigned to the surface type “Floor” in the .mtf file.

However, if a surface is not assigned to one of the 15 standard surface types by moving it to the corresponding layer in SketchUp (for example a surface on “Layer0”), you will get a warning message:



Figure 16: Surfaces on non-standard layers export warning message, with “Misc. 4” selected in Preferences

If you click “yes”, then all surfaces which are not on one of the 15 standard surface type layers will be assigned to “Misc. 4” in the exported .mtf-file (or what else you have selected in the preferences). The model is not changed.

If you click “no”, then the export is aborted.

The surface type which is used to replace non-standard layers for export is selectable in the preferences; default value is “Misc. 4”. However, if you have selected “(none)” in the

Preferences, all surfaces which are currently in your model on non-standard surface type layers will not be exported at all. If you have selected “(none)” in the Preferences, you will get this warning message during export:

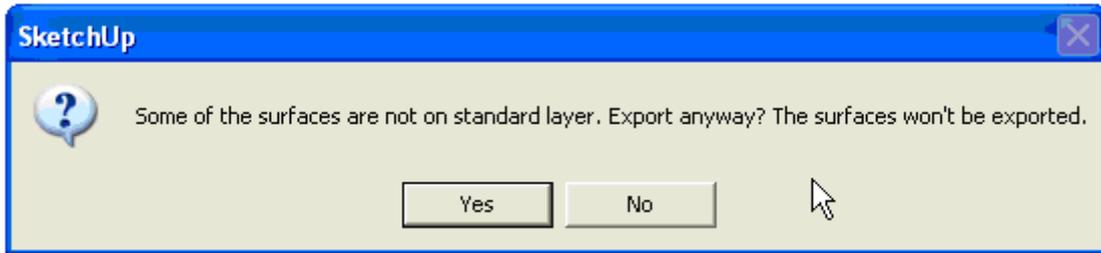


Figure 17: Surfaces on non-standard layers export warning message, with “(none)” selected in Preferences

If you click “yes”, only surfaces which are placed on one of the 15 standard layers will be exported. Choosing “no” will abort the export.

4.1.3. Different materials assigned

Bose Modeler software does not recognize a front- and a back side of surfaces. Therefore, it is logical that surfaces cannot have different materials assigned on front- and back side. However, this is possible to do in SketchUp. If you have done so for whatever reason (e.g. an interior partition on one side with “wood” and on the other with “cloth”), you will get the following warning message:

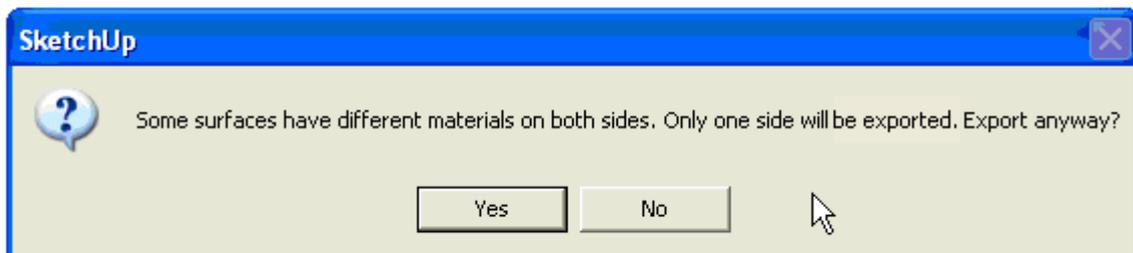


Figure 18: Export warning message for surfaces that have different materials on front- and back side assigned

If you click “yes”, then only one side of the surface will be exported. Click “no” to abort the export.

The exported side is (internally in SketchUp) the front side. However, it is near difficult to impossible to determine which side this is. For this reason, it is strongly advised to use the same material on both sides if reasonable, or, if necessary, model the object as a box.

5. Model Debugging Views

The Modeler Software Plugin for SketchUp provides for the user, four integrated debugging features to help in the creation of models are compatible with the Modeler software. These buttons are in a separate group next to the “Export” button in the Modeler Software Plugin for SketchUp Toolbar:



Figure 19: Integrated debugging views accessible from the Toolbar.

All four buttons are “toggle” type of buttons. This means if you click the button, the special view is selected and the button is shown as depressed. The following example shows the “Show faces on non-standard layers”-button in pushed state:



Figure 20: “Show faces on non-standard layers” selected.

Simply click again to deselect this view; the button will come back to its original state.

If you click a different button out of the four debugging views while one of the views is active, the active view is automatically deselected and the one clicked is selected. You can then return to normal modelling state if you simply unclick the active button.

5.1. Show faces on non-standard layers

This function allows you to display all surfaces in the model which are not assigned to a layer corresponding to any of the standard surface types as used in Bose Modeler software. Therefore, it makes it very simple to find such surfaces and assign them to the desired layer.

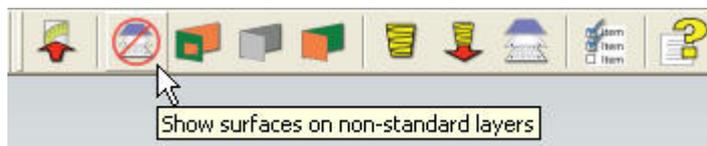


Figure 21: Accessing debugging view “Show faces on non-standard layers”

Just click the button to see all surfaces which are not on standard layers according to Modeler surface types, the remaining part of the model will disappear.

You can then start moving surfaces to the desired layers.

Simply select surface or multiple surfaces, and choose the desired layer in the SketchUp Layer Toolbar.

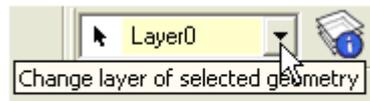


Figure 22: SketchUp Layers Toolbar (not part of the Modeler Software Plugin for SketchUp)

However, these surfaces will not directly disappear since the check is performed when the button is clicked and not continuously. To re-check your model again, deselect the view by clicking the button and then click the button “Show faces on non-standard layer” again.

If all surfaces in your model are on one of the 15 layers corresponding to standard surface-type layers, the complete model disappears when you use the view.

A check for surfaces on non-standard layers is also performed during export and a corresponding warning message is given.

Note: for very large models, this check can take some time and it can not be aborted.

5.2. Show faces with holes

Within SketchUp, surfaces can have holes, without the surrounding surface being cut into two partitions. However, such cases can not be used in acoustic models for Bose Modeler software and the surrounding surface must be cut into two surfaces. This is done simply by using the “pencil” tool, drawing two lines from the inner surface to the outer surface.

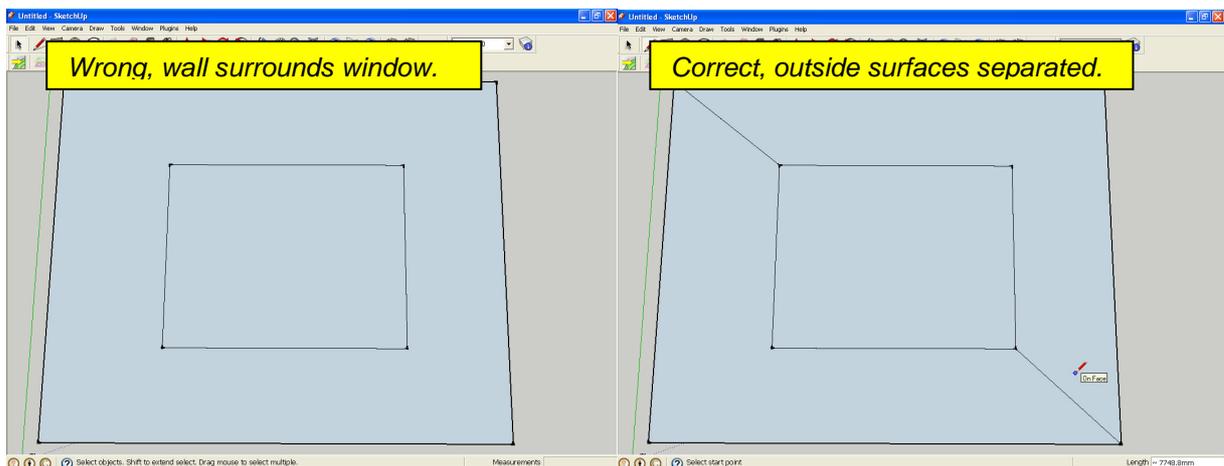


Figure 23: Typical case for surface in a surface (left) which is not possible in Bose Modeler software models. Surrounding surface must be cut into two surfaces (see right).

The function “Show faces with holes” will show you all of these cases; the remaining part of the model without such errors will disappear.

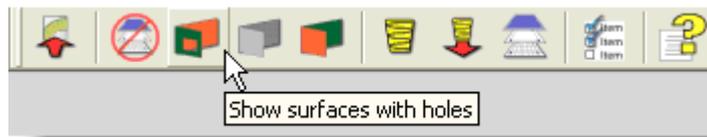


Figure 24: Accessing debugging view "Show faces with holes"

You can then directly edit the faulty surfaces; however, they will not directly disappear. To check again, click the button to deselect the view and click again.

Note: for very large models, this check can take some time and it can not be aborted.

5.3. Show faces without material assigned

This dedicated view will simply show all surfaces which do not yet have any material assigned to either side. The remaining part of the model will disappear.



Figure 25: Accessing debugging view "Show faces without material assigned"

You can then directly start assigning materials to the surfaces which do not yet have a material assigned. Click again to deselect, and click once again to re-check the model if you wish.

5.4. Show faces with different materials on front and back side assigned

Bose Modeler software does not recognize a front- and a back side of surfaces. Therefore, it is logical that surfaces cannot have different materials assigned on front- and back side. However, this is possible to do in SketchUp. A dedicated debugging view is provided to display only such surfaces.

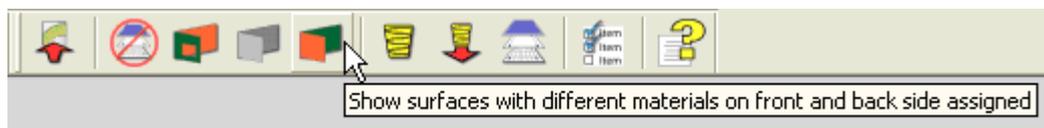


Figure 26: Accessing debugging view "Show faces with different materials on front and back side"

Once selected by clicking the button, only surfaces are shown which have different materials on front and back side. All other surfaces will disappear. You can immediately start editing and assigning materials. Return to normal view by clicking the button again.

A check for faces with different materials on both sides is also performed during export and a corresponding warning is given.

6. Model Material Browser

The Modeler Software Plugin for SketchUp provides its own material browser which is independent from the SketchUp material browser. The browser is used to pick materials directly for use in the model, to display and edit absorption coefficients, and to display and edit Scattering/Specular properties (as used in Bose Modeler software) for each used material.

Materials can be loaded from Bose Modeler software .mat-files or created in SketchUp and assigned with absorption coefficients. All properties are stored inside the SketchUp .skp file.

The browser is accessed by its corresponding button in the toolbar and will then be shown as a floating window.

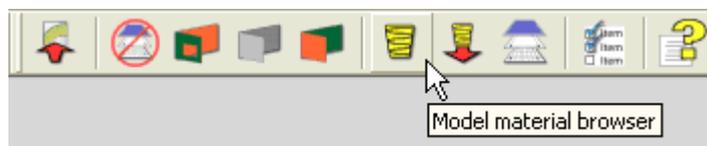


Figure 27: Accessing the Model Material Browser through the toolbar button.

Clicking the button will access the material browser:



Figure 28: Model Material Browser

The browser will now show all materials which are currently in use in your model. This includes materials which are used in components. Components are part of a model; this means that even if you delete visible instances of components in your model, the component

is still accessible in the model. For this reason it is possible that you see more materials in the Model Material browser than you can actually see in the model.

Each material as shown in the browser, is listed in a table and shown with a number, its color, the name, absorption coefficients from 32 Hz through 16 kHz octave bands, and scattering property.

Note: “Scattering” or “Specular”, are handled in the Modeler Software Plugin for SketchUp as property of the material. While in Bose Modeler software, they can be individually assigned for each surface.

Note 2: The Material Browser (and also the Database Browser) are written in HTML. This means that the user can change the font size. Appearance can also depend slightly on the Internet Explorer Version, which is installed on the user’s PC.

6.1. Selecting materials for use

To select a material for using it in your model, all you have to do is click on the “Color” field of the material you want to use. Note that your mouse becomes a hand when you move over the color fields:



Figure 29: Selecting materials directly from the Materials in model browser (right), left the SketchUp Material browser

When you have selected a material, the SketchUp-internal material browser automatically opens. Here you can also edit the color or name of your material if you wish (this is not possible in the Modeler Software Plugin for SketchUp Material browser).

You can now directly apply the selected material to any surface in your model. Note that your cursor changes to the “bucket”  and any surfaces which you now click will be assigned with this material.

Also, note that you can select materials directly from the Database browser.

6.2. Creating new materials

To create a new material, use the *SketchUp interna!* material browser:

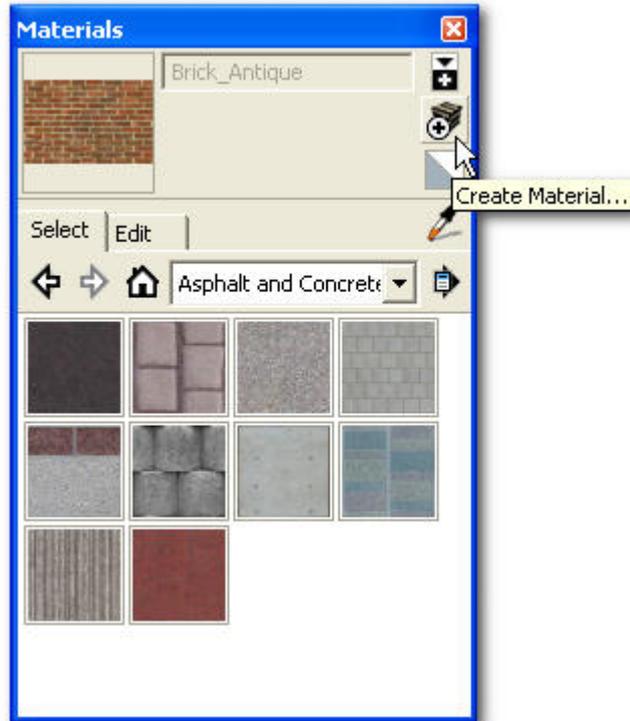


Figure 30: Sketchup Material Browser

Simply create a new material with the name and color you want. It will immediately appear in the Model material browser of the Modeler Software Plugin for SketchUp, where you can edit the absorption coefficients. The default absorption coefficients for new materials are all zero.

6.3. Editing Absorption coefficients

The absorption coefficients for each material and octave band are shown as a fraction of 1, always with two decimals behind the decimal point.

You can simply click into any of the fields and enter the desired value. Once you have entered a value in a desired field, use the “Tab” key to move to the next octave band for the same material.

Note that there are many possibilities to enter the absorption coefficient:

- Both the decimal point AND the comma may be used as decimal delimiter.
- The leading “0” (zero) does not have to be entered.
- If you enter values between 1 and 100, they are automatically divided by 100 and entered as fractions of 1. As an example, you can enter “55” and the field will show “0.55”. You can also enter “2” and it will be transformed into “0.02”.

All values are checked to be an integer between 0 and 1, text is not accepted.

Fields which have been edited are shown in red until the “Apply” button is clicked:



Figure 31: Example for "Material1" which has just been edited (red fields), but "apply" not pressed yet.

The properties for each material are stored within the SketchUp .skp-file. The data is not written until the “Apply” button on the bottom left of the browser is clicked. Once the “Apply” button is clicked, all values are shown in white fields again.

Note: If you change a value and change it back again, it also returns to the white background color as if it had not been edited.

6.4. Delete unused materials

Clicking this button will check if the materials which are currently displayed in the browser are used at all in the model, and automatically delete materials which are not used.

6.5. Delete unused components

A SketchUp model can contain components. For example, the person which you can see in a new SketchUp model (“Bryce” for SketchUp 6, “Sang” for SketchUp 7). You can simply delete them, but the component is still stored in the model (go to the “components” browser of SketchUp to view them).

Even if a component has no used instance in your model, it is still part of the model. This means that the materials will also show up in the Model material browser.

The button “Delete unused components” will delete components which are not used in the model, but still inside the component browser. Note that not only “Bryce” and “Sang” will be deleted, but all components which are currently unused.

7. Material Database Browser

The Modeler Software Plugin for SketchUp contains another dedicated browser, the Material Database browser. Its purpose is to read material files from the Bose Modeler software material database (.mat-files) and display the materials with their respective colors and absorption properties. Materials can then be directly selected from this browser for use in the model.

The browser reads the files “read only”, meaning that the absorption coefficients can not be changed inside this browser. If you want to change absorption coefficients, it must be done in the Model Material browser.

The browser can be accessed through the Modeler Software Plugin for SketchUp plugin menu, but also through its dedicated button:

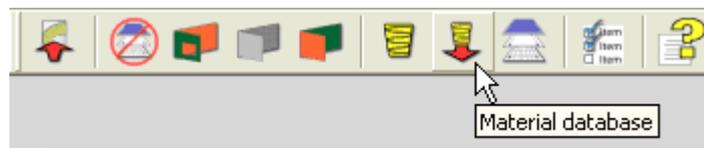


Figure 32: Accessing the Material Database from the button toolbar

Once clicked, the following floating window will appear:

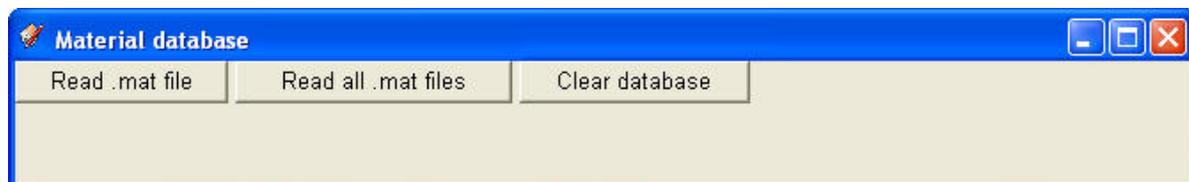


Figure 33: Materials database browser, without any materials loaded.

The browser displays three buttons which are each covered in the following sections.

7.1. Read .mat-file

Clicking this button opens a windows-dialog where you can select the .mat-file which you would like to read into the Modeler Software Plugin for SketchUp:

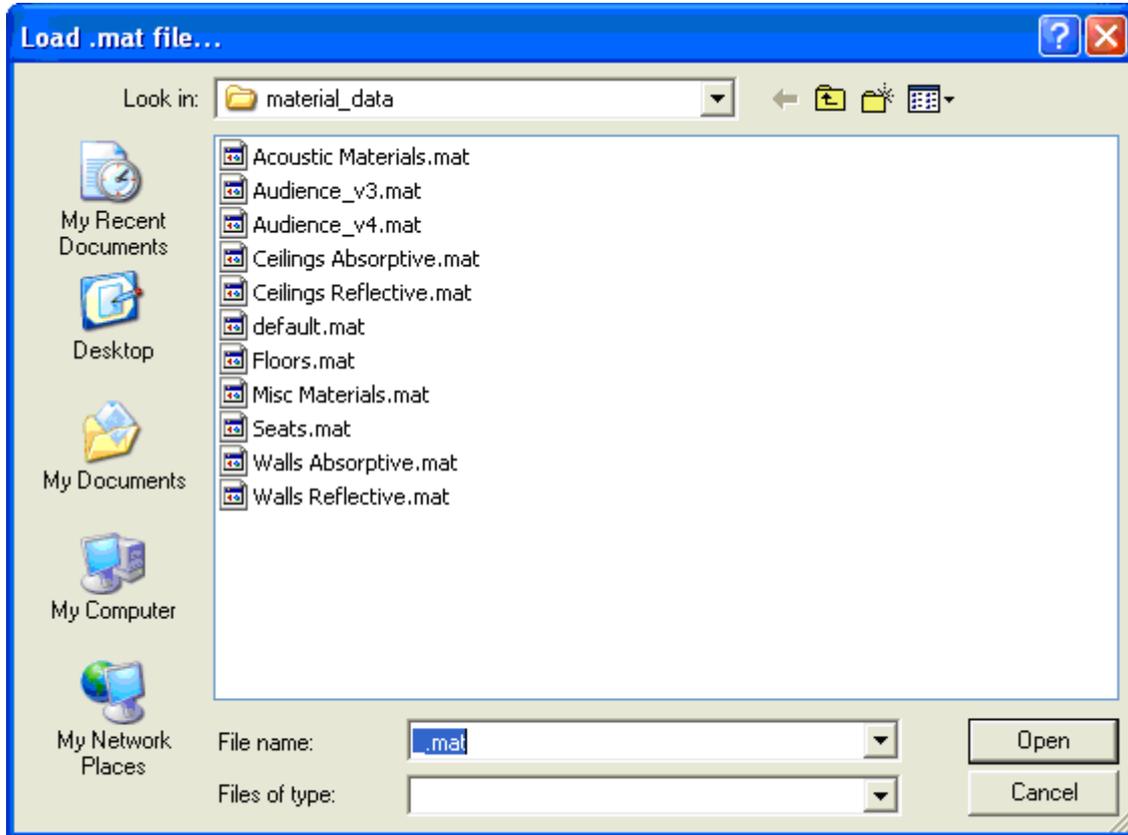


Figure 34: Load .mat file windows dialog

Note that the Modeler Software Plugin for SketchUp, will automatically search your Programs directory for any valid Bose Modeler software installation, and find the correct directory where the path for material data is located.

If you want to change the path, e.g. in case you have different versions of Modeler installed on your PC, you can change the path either in the Preferences or in the above dialog and it will be stored in the Preferences for next time.

You can now select any one of the .mat files in your directory for loading in the browser.

Note: it is **not** possible to select multiple files by pressing the “Ctrl” or “Shift”-keys. This is a limitation of the SketchUp Ruby API.

Once you have selected a file and clicked “open”, the Material Database browser will appear as follows:

The screenshot shows a window titled "Material database" with three buttons: "Read .mat file", "Read all .mat files", and "Clear database". Below the buttons, the file path is displayed: "C:/Program Files/Bose/Bose Modeler Plus 6.6/data/material_data/Acoustic Materials.mat". The main area contains a table with 12 rows and 11 columns. The columns are: "#", "Color", "Name", "32 Hz", "63 Hz", "125 Hz", "250 Hz", "500 Hz", "1 kHz", "2 kHz", "4 kHz", "8 kHz", and "16 kHz". The absorption coefficients are shown in greyed-out text boxes.

#	Color	Name	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
1		AR Type 2 Banner 2" Thick	0.30	0.30	0.30	0.42	0.66	0.95	0.99	0.94	0.94	0.94
2		Acoustic Banner 1" 1.5pcf w/fabric	0.23	0.23	0.23	0.60	0.99	0.99	0.99	0.99	0.99	0.99
3		Acoustic Banner 1-1/2" 1.5pcf w/2mil plastic	0.19	0.19	0.19	0.32	0.64	0.80	0.75	0.56	0.56	0.56
4		Acoustic Plaster 1/2" Zonolite	0.32	0.32	0.32	0.32	0.52	0.81	0.88	0.84	0.84	0.84
5		Conwed ACT 1" wall panel	0.04	0.04	0.04	0.29	0.83	0.99	0.99	0.87	0.87	0.87
6		Conwed ACT 2" wall panel	0.34	0.34	0.34	0.91	0.99	0.99	0.99	0.99	0.99	0.99
7		Conwed DF24 Barrel Diffuser w/low ab	0.99	0.99	0.99	0.62	0.47	0.25	0.15	0.21	0.21	0.21
8		Conwed Hi Impact 1" wall panel	0.22	0.22	0.22	0.49	0.99	0.99	0.99	0.94	0.94	0.94
9		Conwed Hi Impact 2" wall panel	0.37	0.37	0.37	0.88	0.99	0.99	0.99	0.99	0.99	0.99
10		Conwed Pyramid Diffuser - Gel Coat	0.41	0.41	0.41	0.19	0.12	0.10	0.09	0.09	0.09	0.09
11		Owens-Corning 1" 703 - 6 pcf fiberglass	0.06	0.06	0.06	0.20	0.64	0.90	0.95	0.98	0.98	0.98
12		Owens-Corning 2" 703 - 6 pcf fiberglass	0.18	0.18	0.18	0.76	0.99	0.99	0.99	0.99	0.99	0.99

Figure 35: Material Database Browser with example file loaded

In the Materials Database browser, the absorption coefficients are shown but greyed out since they are only read from the .mat file and cannot be edited. “Scattering” or “Specular” reflection properties are not shown since they are not stored in the .mat-file. In order to edit absorption coefficients, assign a material to a surface and use the Materials in Model browser to change coefficients and/or the name.

Similar to the “Materials in Model”-browser, the database browser now displays all materials listed in the .mat-file you selected. Just like in the “Materials in Model”-browser, you can directly pick a material for use in the model by clicking on the color field.

The material will in this case immediately also appear in the “Materials in Model”-browser if it is open.

If you load several .mat-files, the materials will be listed separately for each .mat-file. The name and complete path for each .mat-file is shown above the corresponding materials. Materials from the same .mat-file are listed alphabetically.

7.2. Read all .mat files

It is also possible to read all files in a directory. Since the SketchUp Ruby API does not allow to select multiple files, a dedicated function allows reading all files in a directory. If you click the button “Read all .mat files”, a similar window will appear:

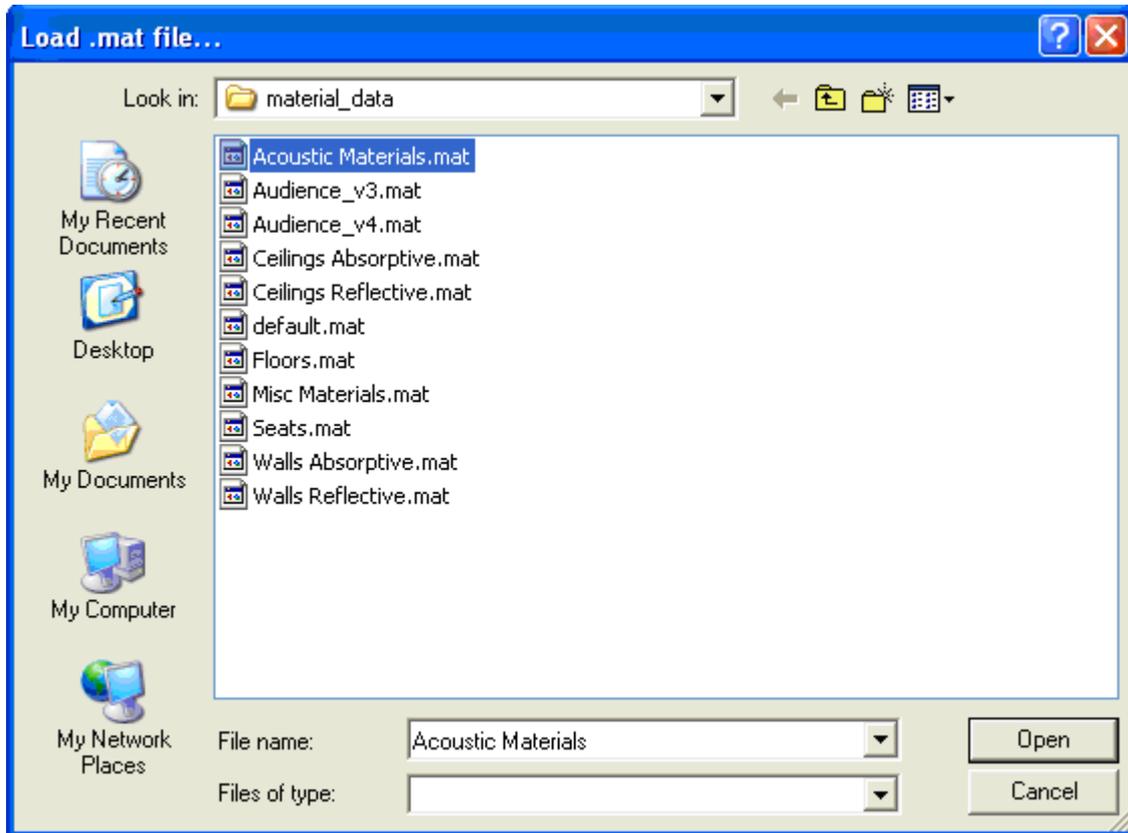


Figure 36: Load .mat files window, will load all files in one directory.

It is necessary to select each one of the .mat files in the directory you wish to be loaded completely. All files in the directory will then be read.

The name and complete path for each .mat-file is shown above the corresponding materials. Materials from the same .mat-file are listed alphabetically.

7.3. Clear database

The function “Clear database”, allows the user to completely clear the loaded .mat files. This does not mean that materials which have been used in the model are cleared. All materials which have already been applied or loaded in the “Materials in model” browser, will stay in the model.

7.4. Duplicate loading of files and materials

If you attempt to load the same .mat-file again, it will not be reloaded. However, if two .mat-files with different names are loaded which both contain a material with the same name, the material is loaded twice.

If you choose a material again which is already used in your model and thus already listed in the Model material browser, the same material will be used.

However, if the absorption coefficients have been changed in the Model material browser, and you pick the original material *again* (with unchanged and thus different coefficients to the one you have already used), the following message will appear:

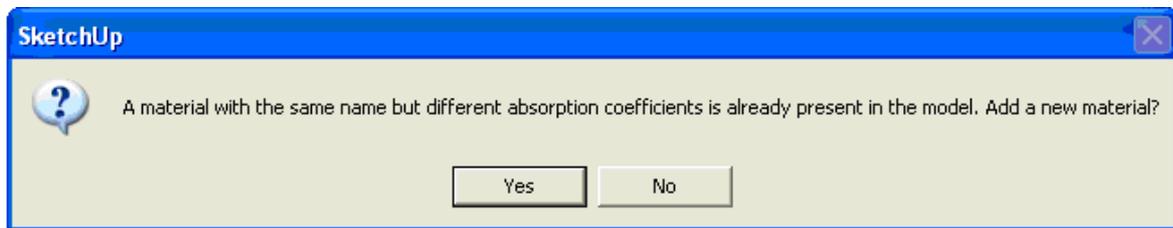


Figure 37: Warning message if material with same name, but different absorption coefficients is already used in the model.

If you click “Yes”, a new material will be created with a number added behind the material name. For example, if you select a material called “absorber” from the Database browser, change the absorption coefficients and then choose “absorber” again from the Database, the above dialog will appear. If you click yes, you will have a material with the name “absorber1”, the next one “absorber2” and so on.

If you change the color of a material and select it again from the database, always the new color is used and no warning message is given.

7.5. Color handling for imported materials

Bose Modeler software .mat-files can *optionally* include colors in RGB format. If a material has a dedicated color, this color is also used in SketchUp. However, many .mat files supplied with older Bose Modeler software versions do not include colors for every material. If no color is found in the .mat file, a color is created based on the absorption coefficients as follows:

Red: 32Hz, 63Hz and 125Hz octave bands

Green: 250Hz, 500Hz and 1kHz octave bands

Blue: 2kHz, 4kHz, 8kHz and 16kHz octave bands

The respective octave bands are averaged and scaled to an 8-bit value and applied to the

material. This makes it easy to roughly see the properties of the absorber.

Colors are applied during import; if the absorption coefficients are changed in the Model Material Browser, they are not updated to the above color scheme.

7.6. Layer Browser

The Modeler Software Plugin for SketchUp offers a dedicated browser for SketchUp layers. Layer names in SketchUp are used to assign the surface type as it is used in Bose Modeler software. There are 15 surface types available, and it is useful to use layers in your model with the same names as the surface types.

The Layer browser allows to automatically create 15 layers with names identical to the surface types in Modeler. Furthermore, empty layers can be deleted and layers can be assigned as “occupied” for later use in Bose Modeler software.

7.7. Add standard layers

This function adds the 15 standard layers to your model.

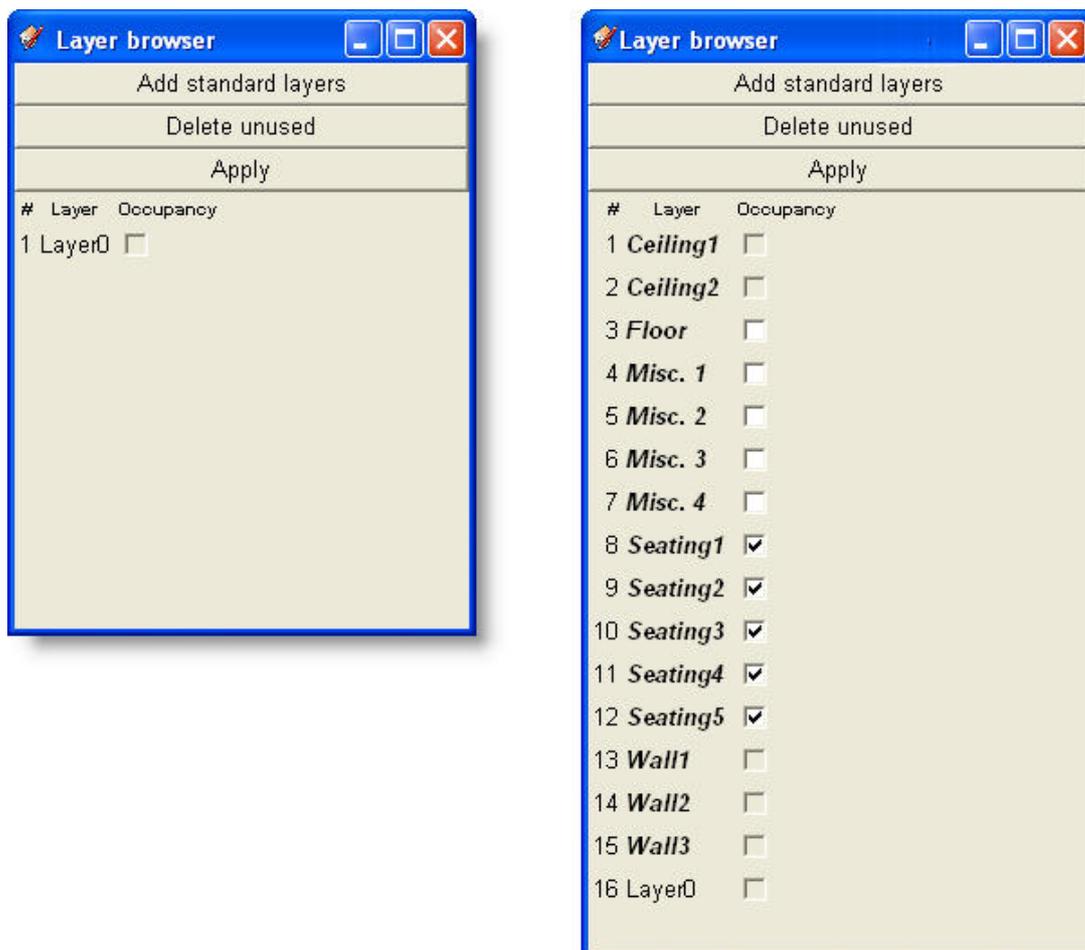


Figure 38: Adding standard layers to the model, before and after using the function.

Any layers which have already been in your model previously, will be shown at the bottom of the browser.

7.8. Delete unused layers

Clicking this button will automatically delete all layers in the current model which do not contain anything, with the exception of Layer0, which cannot be removed.

7.9. Assigning Occupancy

The Layer browser is also used to assign occupancy as used in Bose Modeler software for prediction. Note that in Modeler, occupancy is a property of single surfaces, while in the Modeler Software Plugin for SketchUp, occupancy is assigned to all surfaces of a layer.

Note that occupancy can only be assigned to those layers where the corresponding surface type in Bose Modeler software is allowed to be occupied. These are the “Floor”, “Seating” and “Miscellaneous” surface types. To assign occupancy, simply check one of the boxes for a layer you wish to be exported with occupancy.

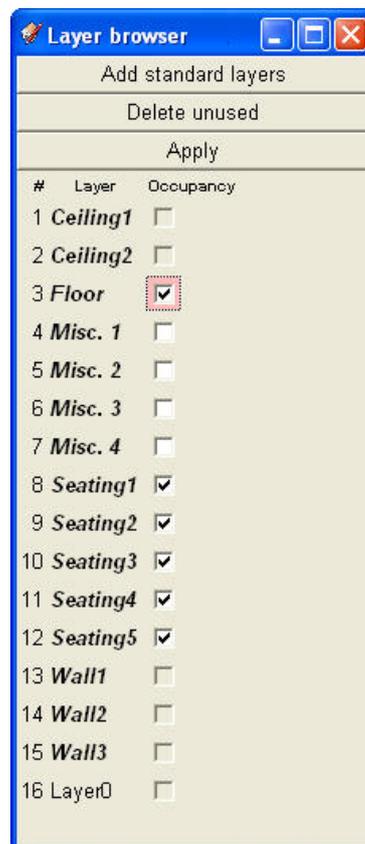


Figure 39: Applying occupancy to layers—changed settings shown in red not stored until “Apply” is clicked

The checked box will then be shown in red to indicate that the setting has not yet been stored in the model. To store the setting in the model, you must click “Apply”. If you close the Layer browser without clicking apply, settings will not be saved in the model.

8. Preferences

All user-related settings are not stored in the model but rather in the Modeler Software Plugin for SketchUp preferences.



Figure 40: Accessing the preferences from the Modeler Software Plugin for SketchUp toolbar

The following window will appear:

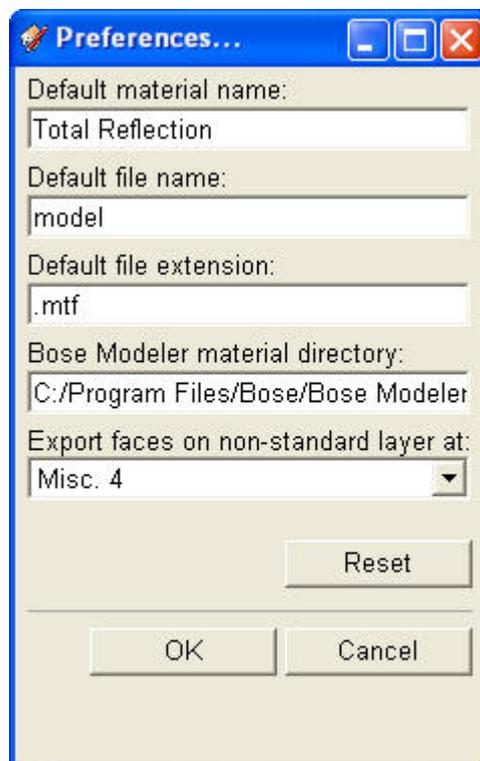


Figure 41: The Modeler Software Plugin for SketchUp preferences window

Note that this window must be closed to continue working on your model.

The following settings can be made here:

- **Default material name**
Any surfaces which have no material assigned, will be exported with this material. Default: "Total Reflection".
- **Default file name**
Suggested filename for the export, and can be changed during the export. Default: "model".

- **Default file extension**

This file extension will always be used for the exported file. Default: “.mtf”.

- **Bose Modeler software material directory:**

The path which the Modeler Software Plugin for SketchUp will suggest when you open .mat-files with the Material Database Browser. This path is automatically detected by the Modeler Software Plugin for SketchUp, by default.

- **Export faces on non-standard layers to:**

With this pull-down menu, you can select the dedicated surface type for the .mtf-export for any surfaces in the model which are not on any of the standard layers corresponding to the Bose Modeler software surface types. If you select (none), they will not be exported at all. Default: Misc. 4.

Clicking the “Reset” button, resets all values to the default values, for the Bose Modeler software material directory, the correct path is detected again by the Modeler Software Plugin for SketchUp.

As in the two material browsers, any settings which are changed, are shown in red until you click “OK” which saves the settings. Click “Cancel” to abort.

Note: The actual settings are stored in a file called “SU²Modeler.ini”. On English systems, this file is found at:

C:\documents and settings\[yourname]\application data\SU²Modeler\SU²Modeler.ini

For vista compatibility and some XP environments, this is necessary as the system will otherwise not allow writing the file.

9. Modelling Tips

This section gives some hints about how to model for export to Bose Modeler software.

Keep in mind that the Modeler Software Plugin for SketchUp, is an *interface*, not an automatic tool for generation of perfect acoustic models. That means: models have to be built in such a way that they work later in Bose Modeler software, including all constraints for acoustic models.

If you are not sure what requirements a model should meet to enable calculation and reliable results in Bose Modeler software, please study the Modeler Manual accordingly.

SketchUp luckily checks for some things automatically; it allows you to draw a surface only if all the corners are really in one plane. But there are many things SketchUp allows you to do which shouldn't be done for acoustic models, like planes cutting other planes, planes on top of each other and more. It is the users responsibility to check that the model is done correctly in SketchUp. The built-in debugging functions can [help](#) to find errors, but can not replace the user's knowledge for acoustic models.

9.1. Material Assignment

To assign materials, you can click on a material either in the SketchUp internal material browser, in the Model Material Browser, or in the Material Database. Your cursor will change into the bucket symbol: 

Within Bose Modeler software, surfaces do not have a plane normal. This means that there is no difference between front and back. As long as you export from SketchUp only to Bose Modeler software, it doesn't matter if you assign your material to the front or to the back side.

However, the Modeler Software Plugin for SketchUp is compatible with other SketchUp exporters for acoustic prediction software developed by [Rahe-Kraft](#):

- CATT-Acoustic models can be exported with SU2CATT
- EASE Models can be exported from SketchUp in .xfc format with SU2EASE

An Odeon version is currently under development.

Unlike for Bose Modeler software, it is critical for all other acoustic prediction software mentioned above that the material is assigned to the side of a surface where it should be in the exported model. CATT, Odeon and EASE distinguish between a front- and a back side of a surface.

For this reason ***it is strongly advised*** to always assign materials to the side of a surface where it actually is in the space or room you are building. If you do so, a SketchUp model can be exported to different prediction software without any changes in the model.

For CATT and EASE, materials (e.g. “planes” in CATT and “faces” in EASE) will appear on the side where they have been modelled in SketchUp.

As a summary, just place materials visually in the model where they actually are.

9.2. Double-sided surfaces

9.2.1. Same materials on front and back

It is possible to have a surface assigned with the same material both on the front and on the back. This can be the case e.g. if you have an interior glass wall or handrail. This case is treated differently in different prediction software packages (Bose Modeler software, CATT, EASE, Odeon).

For **Bose Modeler software**, there is no direction for any surface. Consequently, it is not necessary to have material assigned on both sides of the surface - one side is sufficient. However, this would lead to errors when exporting to other prediction software.

For this reason a special function has been implemented for the export: if a surface is assigned with the same material on front and back, *only one side* will be exported by the Modeler Software Plugin for SketchUp. This will result in correct handling within Bose Modeler software. Since the materials are the same, it doesn't matter which side is removed during export.

At the same time, the model can also be used with SU2CATT or SU2EASE for Export to CATT and EASE (where a surface with materials assigned on both sides will be treated as two surfaces back-to-back).

For this reason ***it is strongly advised*** to assign materials to both sides of a surface if this is actually the case in the room or space you are modelling. If you do so, a SketchUp model can be exported to different prediction software without any changes in the model.

9.2.2. Different materials on front and back

For Bose Modeler software, it is not possible to have one surface to have two different materials on the front and the back side. This would be a rare case in reality, e.g. a thin wooden partition with a reflecting wood on one side and e.g. a pinboard on the other side.

For Bose Modeler software, this special case must be modelled as a box, meaning the wall itself must have some thickness and can not be infinitely thin.

Because it is possible for other prediction software (CATT and EASE) to model cases with a different front- and back side and because SketchUp allows you to do so, two functions have been implemented in the Modeler Software Plugin for SketchUp that deal with such cases:

- A warning will be shown during export in case your model contains surfaces with different materials on front and back side, and one side will be removed:

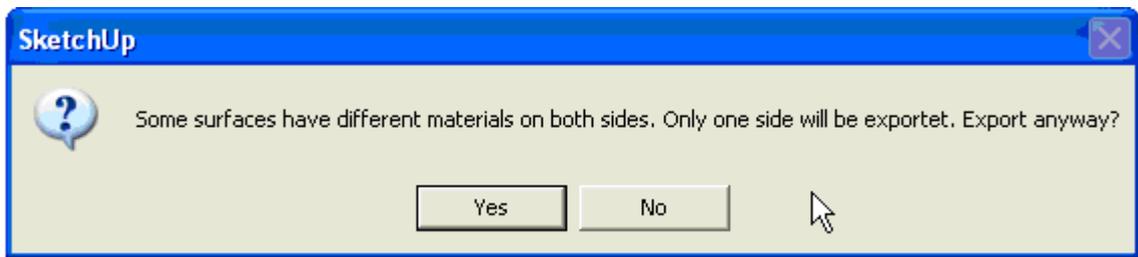


Figure 42: Warning message during export for different materials on either side

- Use the debugging view “Show surfaces with different materials on front and back side assigned” to find these special cases.

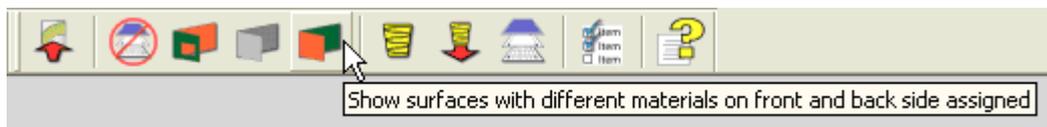


Figure 43: “show faces with different materials on front and back side assigned” debugging views

9.3. Common Errors

9.3.1. Surface-in-Surface problems and how to find them

This is probably the most common error. Typical case is e.g. a window in a flat wall. SketchUp allows that the outside surface (the wall) can completely surround the inside surface (the window). Be sure to fix these errors since they can create major problems for ray-tracing software, and also cause errors for statistical (Sabine or Eyring) calculations.

For these cases, we have provided a function which will show you all the faces with holes so they can be easily found and fixed.

You can check by clicking the "Show surfaces with holes"- Button. Only faces with holes or surface-in-surface will be shown in a dedicated view. You can then directly edit these faces. Click the button again to toggle back to the entire model.

How should those problems be fixed?:

Divide the outside plane into two planes as shown below.

It is not sufficient to draw only one line, because you will still have some corners twice in the same face which will cause errors.

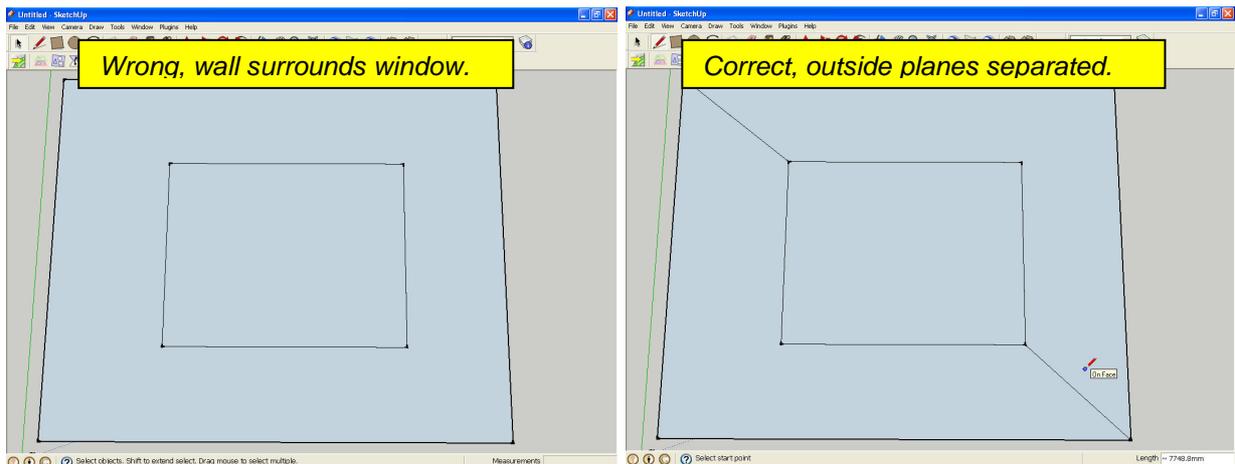


Figure 44: Typical case for surface in a surface (left) which is not possible in Bose Modeler software models. Surrounding surface must be cut into two surfaces (see right).

9.3.2. Modelling of interior objects

If you have objects which are “floating” in your room (e.g. tables), they should have sufficient distance to any surfaces. Objects which in reality touch the floor should not be modelled as floating objects, but be extruded from the floor; this is very easy to do in SketchUp. If you do need a floating object, make sure it has sufficient distance from the adjacent surfaces.

When making e.g. columns which go from floor to ceiling, you must take care that the floor and ceiling are divided and do not surround the column.

The top and bottom of the column must not be modelled; both in SketchUp and in Bose Modeler software, you must be able to see through the model from top to bottom.

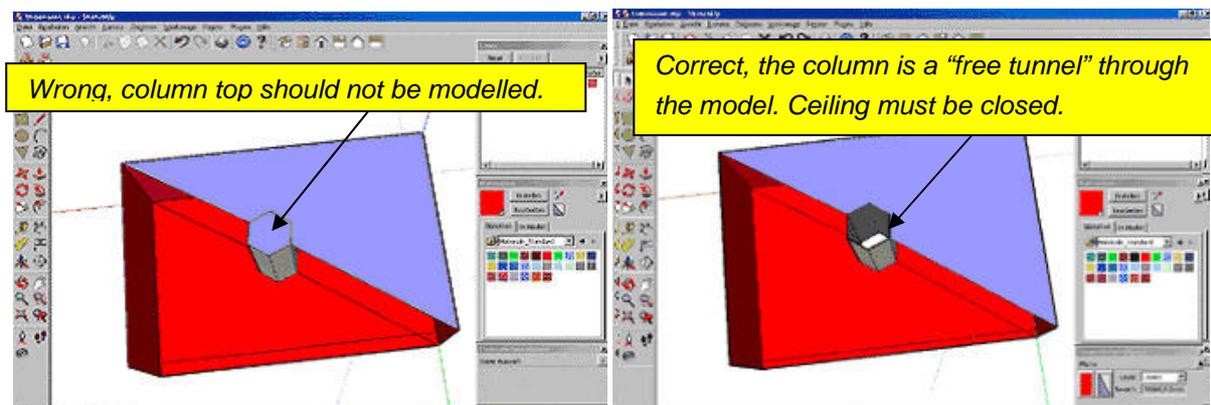


Figure 45: Typical error which appears with columns in a room; top and bottom of the column must be removed.

9.3.3. Other problems and how to deal with them

SketchUp won't close a plane:

There is a simple reason: the corners are not on the same (virtual) plane! Either change some corners or make triangles. Many times it is easier to delete some sections and redraw them than to find the error.

Some objects or surfaces do not show up in the Modeler model:

Most probably, you made some nice tables, chairs or columns of components. **Components will not be exported**, unless they are exploded first.

10. The .mtf File Format

The .mtf file format is the **M**odeler **T**ext **F**ormat. It has been developed in order to exchange all necessary information for a Bose Modeler software project in a text-file, including model geometry, material assignments, absorption coefficients, source and receiver locations and further additional information.

Currently, the Modeler Software Plugin for SketchUp, does not export sources (loudspeakers) and receivers (listeners).

The syntax of the .mtf-file as it is exported by the Modeler Software Plugin for SketchUp is explained in this section; however, an .mtf-file can contain more information. This section is therefore not a complete description of the .mtf file format; please enquire with Bose Professional Systems if you are interested in a complete description of the file format including loudspeakers and receivers.

A typical .mtf-file exported from the Modeler Software Plugin for SketchUp, looks like this:

```
.VERSION
1.0.0.0
.END
```

This section declares the .mtf file format version.

```
.TIME
04/17/09 15:02:31
.END
```

Time and date on which the file was written or exported.

```
.SOURCE
SketchUp v7.0.10247 with SU2Modeler v0.71 beta
C:\Documents and settings\testuser\Desktop\testfolder\testfile.skp
.END
```

SketchUp and SU²Modeler version used for export

Filename and path of the SketchUp file.

```
.MATERIALS
Mat A 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 (96,187,111)
Mat B 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 (76,172,242)
.END
```

Materials:
name of material

10 absorption coefficients for 32Hz-16kHz octaves for each material, as percentage of 1, with 1/100 precision

color in (R,G,B) format

```
.SURFACES
1 3 (4.0,-6.5,0.0) (4.3,0.9,0.0) (2.6,-6.0,0.0) Mat A Misc. 4 Unocc. Specular
2 3 (-1.6,2.2,0.0) (-1.6,6.2,0.0) (1.3,2.2,0.0) Mat B Misc. 4 Unocc. Specular
.END
```

Surfaces:
number of surface

Number of corners in surface

Geometrical surface description by XYZ coordinates

Material for this surface

Surface type (in SketchUp: layer)

Occupancy, "Unocc." or "occupied"

Reflection type, "Specular" or "Scattering"

The file can contain any number of surfaces with any number of corners. Material descriptions are written only once for every material.

Note: the integer precision for the coordinates is 7 digits behind the decimal point (limited to 1 digit in the above example for better understanding).

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SketchUp is a registered trademark of Trimble Navigation, Ltd. in the U.S. and/or other countries.