FirstRate5® Guidance Note

GN03 Floor Builder & Project File Upgrade Process

(version 1.0, 6 December 2018, FR5 v5.2.10)

Prior Reading

Before proceeding with this Guidance Note it is <u>essential</u> that you read the following new sections of the FirstRate5 User Manual. The manual is a PDF document that can be opened by clicking on User Manual under Help on the File menu.

Task 9	Select the floor types to use in the rating	
Task 10	Assign a floor type and properties	
Task 11	Create or edit a floor	
Task 12	Manage Construction Libraries (Floor)	

Contents

This Guidance Note will demonstrate the following:

Concept

The new Floor Builder functionality allows FR5 users to create and use Custom Floors where the pre-defined System Floor constructions do not meet their needs. A Custom Floor can be defined by layer and thickness from a fixed list of materials.

FR5 has historically provided a fixed number of pre-defined floor constructions from which to choose. These covered the most commonly used constructions. However, as building technology progresses and the number of bespoke constructions increases, so too does the need for a more flexible approach to floor specification.

The addition of this functionality allows FR5 users the flexibility to create Custom Floors and provides FR5 users with greater transparency into the floor detail contained in the models.

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Using System Floors

If you have no need to create Custom Floors you can continue to use the System Floor constructions as before. You should note:

1. The names of System Floor constructions are now preceded by *FR5-* in order to distinguish them from Custom Floors.
2. System Floor constructions can be found in the *FR5 : Standard FR5* folder within the *Floor* sub-tab under the *Construction Libraries* tab.
   When upgrading pre-v5.2.10 project files, users will have to redefine the bulk insulation, specify an air gap and define floor connection properties of each defined floor (See Section 10 Assign a floor type and properties in the User Manual, and further advice below)
3. In order to define air gaps please refer to *Specifying an Air Gap* below.

Creating a Custom Floor

In order to create a Custom Floor, ensure you have the relevant floor information from the building designer or product manufacturer including:

1. Thickness and material of each layer of the construction from top to bottom.
2. The emissivity properties of each vertical surface facing into an air gap.

In the following example a Custom Floor with the following build up will be created:

Particleboard floor with insulated reflective air gap and plasterboard bottom lining
> *Top*
> 22mm   Particleboard Structural Flooring
> 300mm Void   15mm Polystyrene extruded with reflective foil
> 285mm Air Gap (unventilated with reflective foil) to fill remainder of void after polystyrene extruded insulation added (see below)
> 10mm   Plasterboard
> *Bottom*

- Launch FirstRate5 v5.2.10
- In the *Floor* sub- tab under the *Construction Types* tab, click *New Floor Type*
- Enter a Floor Name. It is recommended that a short name which best identifies the floor be used for ease of selection later. Note that the Floor Code automatically comprises of the initials of the Floor Name. This may be manually overridden if necessary. This name will appear in the *Zoning* tab, *Properties Pane* drop-down menu in the *Plan* tab, and the *Certificate* amongst other places.
- Add the floor layers as described above using the Up, Down and Flip buttons if necessary to arrange the layers into the correct sequence from top to bottom. When you come across either an air gap or the location of some bulk insulation simply insert an Insulation Placeholder by clicking *Add Insulation Layer* button.

What is an *Insulation Placeholder* and why are they used?

An insulation placeholder is a location in the floor's construction where insulation (bulk + air gap) can be placed. The placeholder is editable in use which means that a single floor type used in multiple locations throughout a plan each with different insulation properties if necessary.

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- Click on the insulation placeholder followed by the *Edit Default Insulation* button. The *Floor Builder – Insulation Editor* dialogue box opens.

- *Click Add Layer* twice

- Click on the edit button on the top insulation layer. Specify the type and K-value of the insulation from the *Specified conductivity* list (*Polystyrene extruded k=0.028*) and click *OK*. Change the thickness displayed to 15mm

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Specifying Bulk Insulation

Bulk Insulation is specified in one of two ways:
1. Specified resistance
2. Specified conductivity
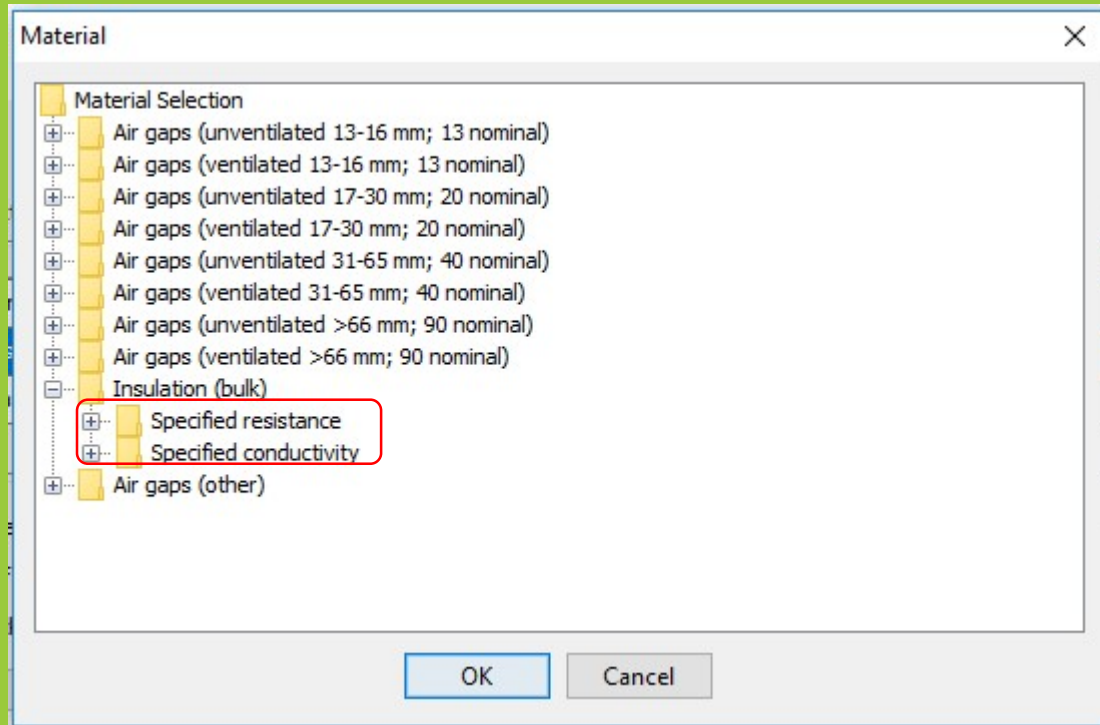
Specified resistance specifies the bulk insulation by R-value, eg, *Glass fibre batt: R2.5.* Each option has a fixed width, and when selected, this width is automatically entered into the floor construction.

Specified conductivity specifies the bulk insulation by k-value, eg, *Glass fibre batt (k = 0.044, density = 12 kg/m3)*. Each option requires the user to define a width before an R-value is displayed. So in this example, if the user defines a thickness of 110mm, an R-value of R2.5 results.

- Now click on the edit button on the bottom insulation layer. Select the *Air gaps (unventilated >66mm; 90 nominal) > Horizontal > Air gap Horizontal >66mm (90 nominal) unventilated reflective (0.05/0.9; E = 0.05)* and click *OK*. Here we have selected a reflective foil with an emissivity value of 0.05 and plasterboard with an emissivity 0.9 resulting in a total emissivity of 0.05. General building materials are considered to have an emissivity of 0.9, reflective foils have a lower emissivity value. Note that the thickness displayed will be the nominal thickness (i.e. 90mm). Manually change this to 285mm (300mm-15mm = 285mm). The graphic changes at the top of the dialogue box to 300mm total for the insulation placeholder. If necessary use the *Up*, *Down*, or *Flip* buttons to arrange the order of the insulation layers. When you're satisfied, click *OK*.

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Specifying an Air Gap

In earlier versions of FirsRate5 the user specified the number and type of Foil Layers rather than an air gap. However, the calculation engine deals in air gaps rather than foils, so FR5 made certain assumptions, which were not displayed to the user, in order to convert one to the other. In order to remove these assumptions and provide the user with a better understanding of what is being modelled, the user now specifies the air gap directly.

Each air gap within a floor construction has a thermal resistance. This varies based on a number of criteria. To specify an air gap the user selects from a list of options each of which is described by the following criteria:

1.   **Orientation** - in floors this will be *horizontal*;
2.   **Thickness** – select an appropriate range for the thickness of your air gap, eg, pick "*31-65mm; 40 nominal*" for a 35mm wide airspace. The thickness of your air gap should be specified on the drawing set;
3.   **Air movement** – if the air gap in your floor is ventilated in some manner (e.g. vents), then select *ventilated*. If the airspace is enclosed then select *unventilated*.
4.   **Emissivity** (e) of the <u>surfaces</u> on either side of the air gap and effective Emissivity (E) of the <u>air gap</u> - Emissivity (e) ranges from 0.9 for common non-reflective building materials to 0.03 for the shiniest reflective foil products. These figures are expressed as follows, eg, "*0.05/0.9; E = 0.05*", where "*0.05/0.9*" refers to the emissivity of each of the two horizontal <u>surfaces</u> facing into the air gap (in this case one surface is 0.05, for example, an reflective foil, and the other 0.9, a normal building material), and "*E = 0.05*" refers to the effective Emissivity of the <u>air gap</u> taking into account the surfaces on either side. Users should match the Emissivity (e) of the surfaces to the options provided. For common non-reflective building materials select 0.9, for foil products refer to the manufacturer's data sheet for the Emissivity (e) of the surface of the product which will face the air gap.
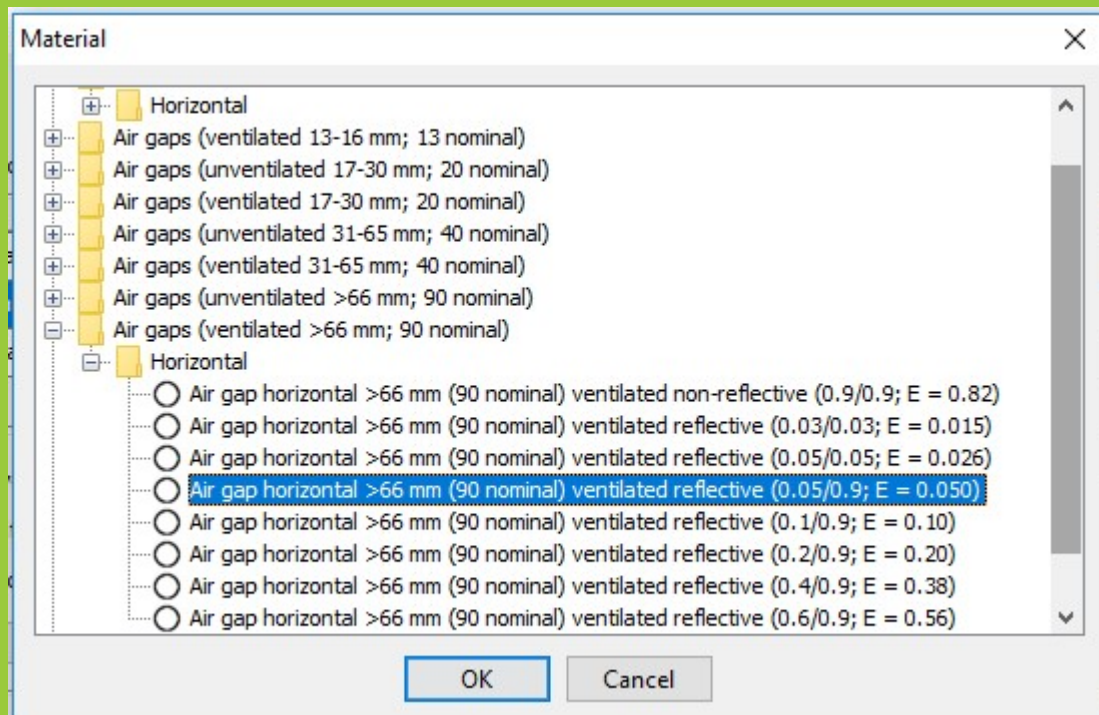
Floor Builder

1. Give your floor a name and code

Floor Name: Particalboard Lined   Floor Code: ParPB

2. Build up your floor layers

▲ Top

(mm)

ParPB : Particalboard Lined

22

300

10

▼ Bottom   R0.54 RAG 1 AG 0

| Add Layer | Delete Layer | Up ▲ | Down ▼ | Flip ↺ | Add Insulation Layer |

	Material	Thickness (mm)	R-value
Top	Particleboard	22	0.18
	Insulation Placeholder	300	0.95
	Plasterboard	10	0.06
Bottom			

3. Add / Edit your floor's default insulation

Edit default insulation

OK   Cancel

- A Custom Floor has now been created. It exists in the project file only and has not been saved to a library. (Note a Custom Floor can also be created through the Floor sub-tab under the Construction Libraries tab by right clicking on a Custom Library and selecting New Floor Type. In this case the Custom Floor would be created directly in the Custom Library)

Untitled - FirstRate

File Edit Help

Project | Plan | Zoning | **Construction Types** | Windows | Roof Windows | Construction Libraries | Analytics | Reports

Floor | Wall

	Floor Code	Floor Name	Library	Used Area
	Tim	Timber	FR5	138.43
	ParPB	Particalboard Lined		0.0
	TimPB	Particleboard Lined	Ex	0.0
	CSOG	CSOG: Slab on Ground	FR5	0.0

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Creating a Custom Library

Users modelling non-standard floors can create Custom Floors using the Floor Builder. In order to be able to copy this Custom Floor into future project files, or share with other users, it should be saved to a Custom Library.

- In the *Floor* sub-tab under *Construction Libraries* tab click *New Library* and enter a unique *Library code* and *Library name*, and then *Save*. A new Custom Library has been created and is saved within your FR5 program files on your computer.
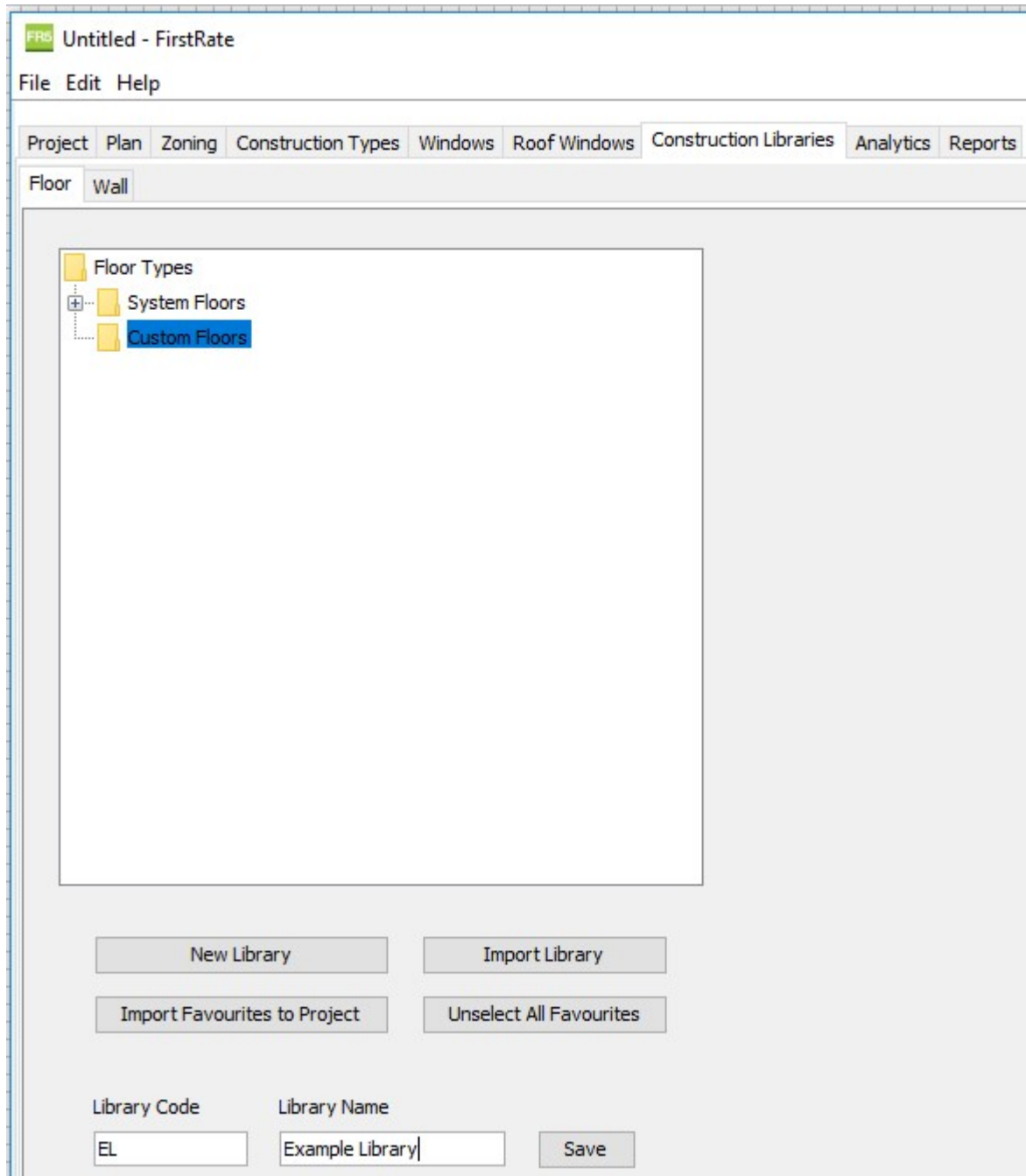
Adding a Custom Floor to a Custom Library

- In the *Floor* sub-tab under the *Construction Types* tab, right click on the Custom Floor, click on *Add To Library*, select our new *Custom Library* from the list and then *Save*.
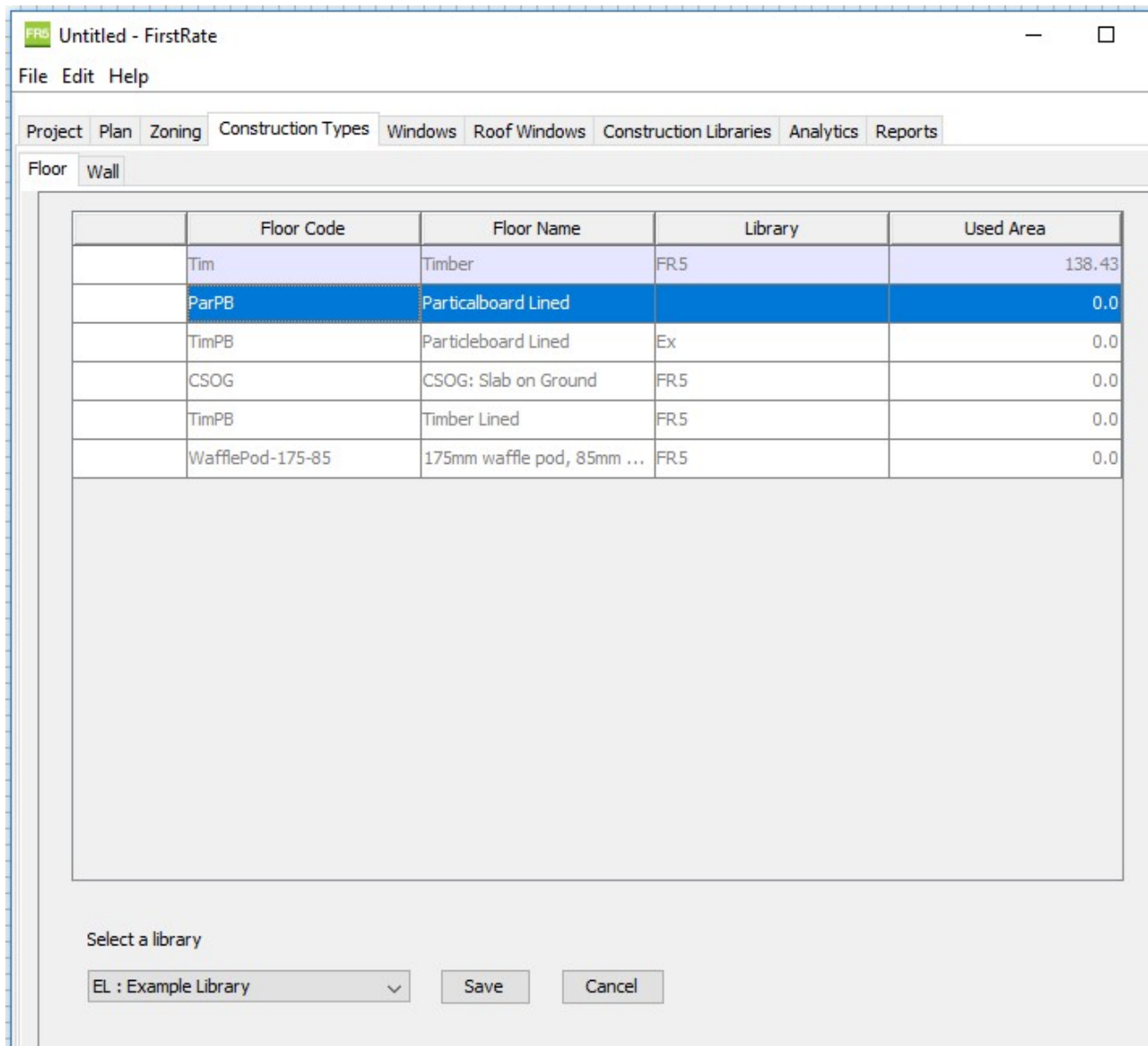

- A copy of the new Custom Floor has now been saved in the new Custom Library.

Exporting a Library

- In the *Floor* sub-tab under the *Construction Libraries* tab, right click on the *Custom Library* and *Export Library*.

- Note, do not include a colon (":") in your file name. It will be saved as a FirstRate5 Library file (.flib). This can be shared with another FR5 user who can import it into their FR5 program files on their computer using the *Import Library* button in their *Floor sub-tab* under the *Construction Libraries* tab.

Marking a Custom Floor as a Favourite

- In the Floor sub-tab under the Construction Libraries tab mark on the System and Custom Floors that you will use most often as favourites. This can be done by clicking on the item until the circle turns green.
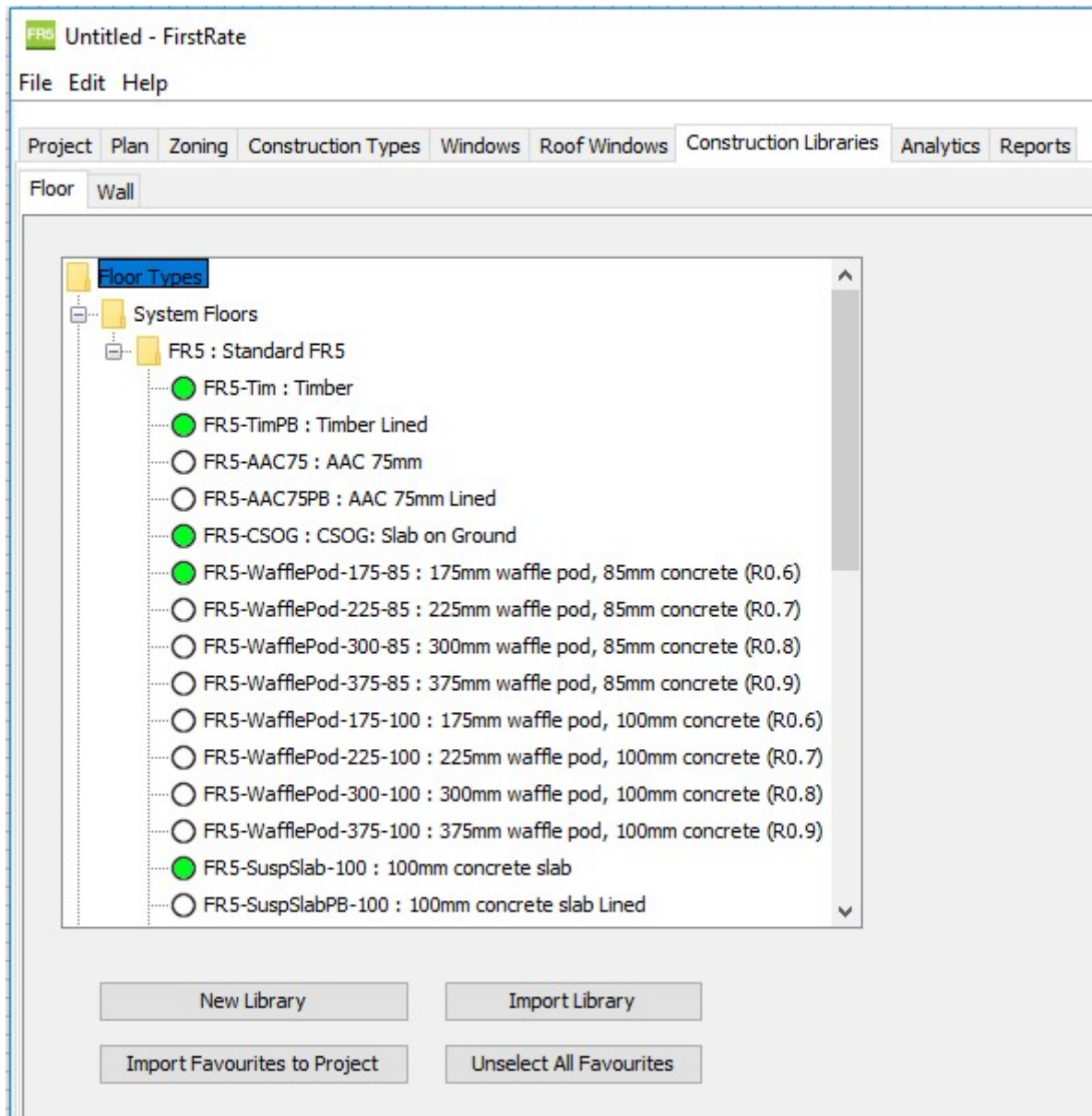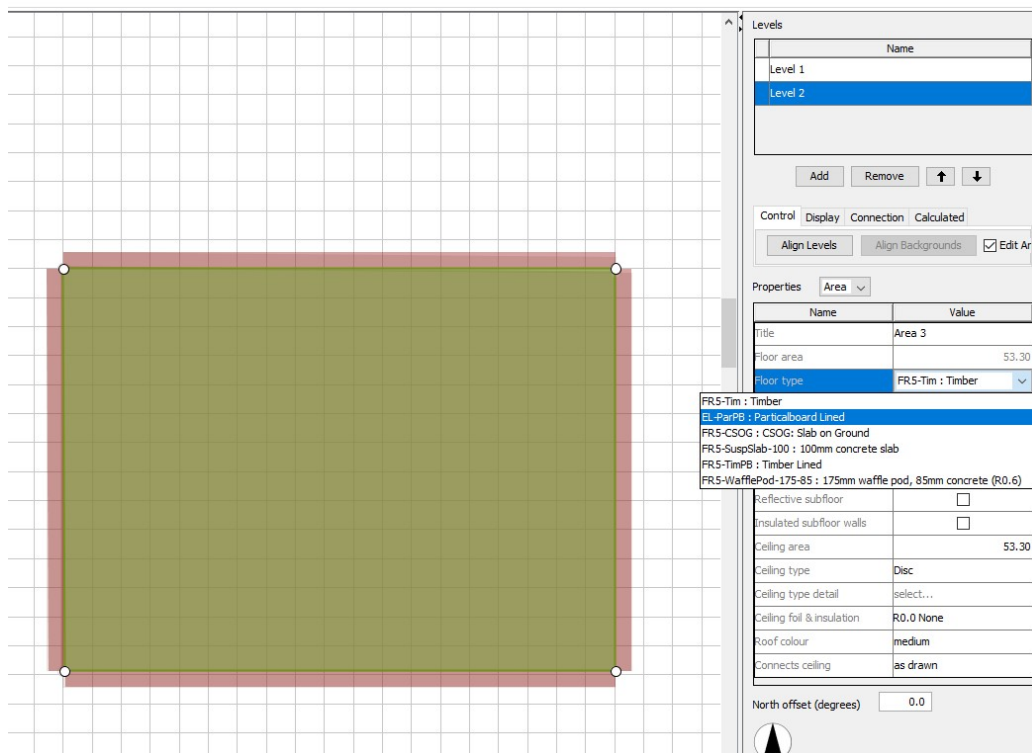
Starting a New File and Using Custom Floors

- Create a new project file. Notice in the Floor sub-tab under the Construction Types tab that only your favourites are displaying.
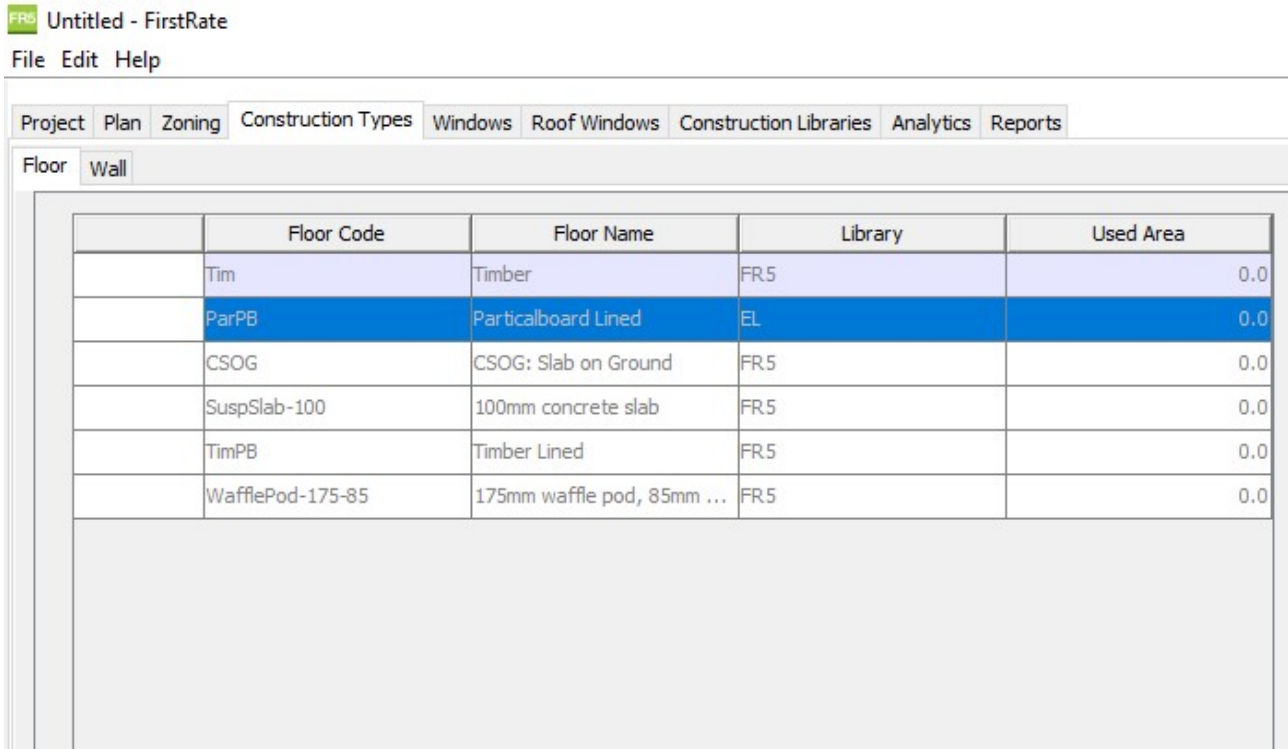
- In addition, in the Plan tab when selecting a Floor Type to assign to a newly drawn floor, only your favourites are displaying allowing a more rapid search and select.

- The *Connects floor* property must be defined depending on each floor condition. This example represents a first level floor, and therefore is set to *as drawn* as the floor connects to the level below.

  The different *Connects floor* conditions can be summarised by the following;

 | | |
  |---|---|
  | *as drawn* | if the floor is adjacent to zone/s that has been drawn on the level below |
  | *neighbour* | if the floor is adjacent to another dwelling below |
  | *create subfloor* | if a subfloor is below |
  | *connect to ground* | if the ground is below |
  | *elevated* | if outdoor air is below. |

- For floors with the *Create subfloor* condition, *Reflective subfloor* and *Insulated subfloor walls* options are now located directly under the properties pane. Also the *Subfloor ventilation* drop-down list is only active if *Create subfloor* has been selected under the *Connects floor* drop-down list (See Section 10 Assign a floor type and properties in the User Manual).
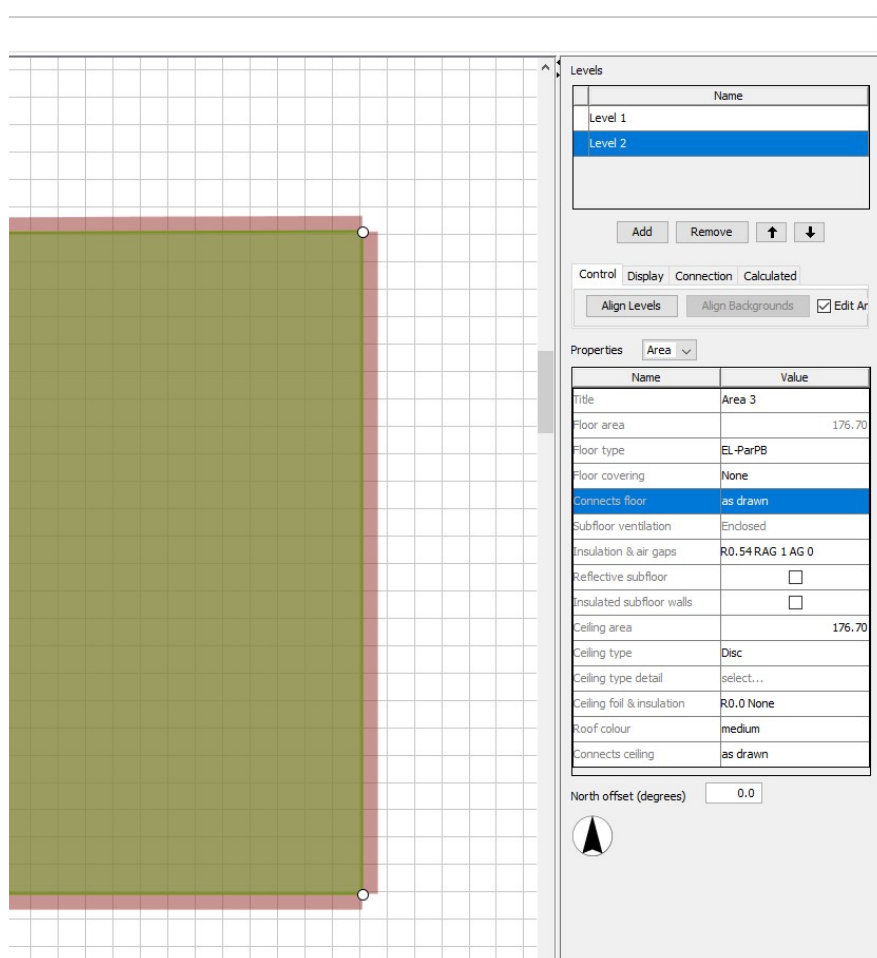
Upgrading an Existing Project File

When an older project file is opened in v5.2.10 it will go through an automatic upgrade process with any modifications made by this process presented in a message box to the user.

- In this case we opened a v5.2.09 project file describing a one room model with four different floor types each with bulk and air gaps specified. The following dialogue box is displayed.
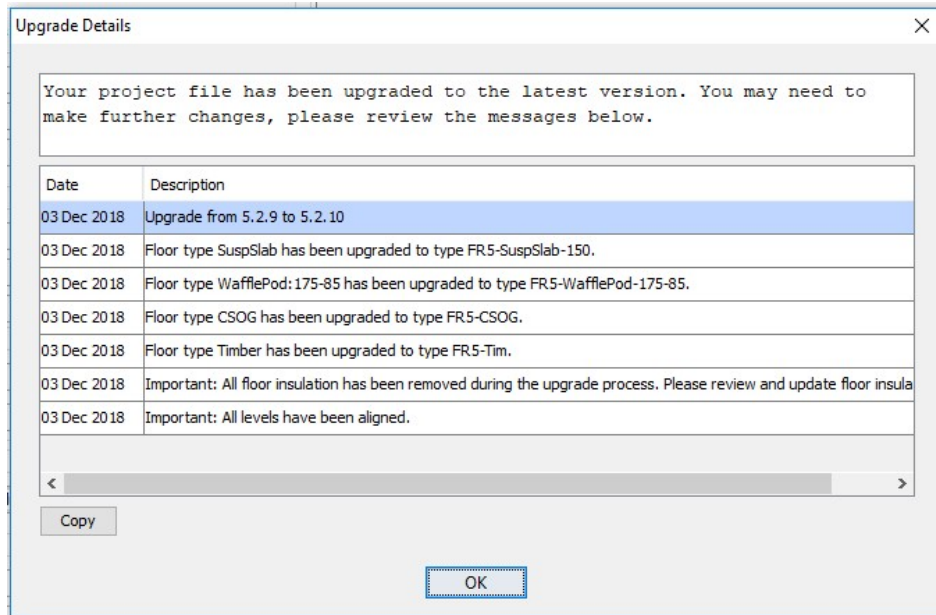
- Once you click *OK* the message will disappear and will not be retrievable. The *Copy* button will copy the contents of the dialogue box to the clipboard, which can be pasted into a text document, see contents below.

03 Dec 2018	Upgrade from 5.2.9 to 5.2.10
03 Dec 2018	Floor type SuspSlab has been upgraded to type FR5-SuspSlab-150.
03 Dec 2018	Floor type WafflePod:175-85 has been upgraded to type FR5-WafflePod-175-85.
03 Dec 2018	Floor type CSOG has been upgraded to type FR5-CSOG.
03 Dec 2018	Floor type Timber has been upgraded to type FR5-Tim.
03 Dec 2018	Important: All floor insulation has been removed during the upgrade process. Please review and update floor insulation.
03 Dec 2018	Important: All levels have been aligned.

- The first item is self-explanatory.
- The next four items advise the user that the System Floors in v5.2.09 have been upgraded to the corresponding System Floors in v5.2.10. In general the only difference is the addition of "*FR5-*" as a prefix in order to distinguish these System Floors from Custom Floors.
- The next item advises that any floor insulation included in v5.2.09 has not been carried over to v5.2.10. This is due to the fundamentally different way v5.2.10 deals with floors compared to earlier versions where not all information is possible to be carried over. The user should specify the bulk insulation and air gap details again as described earlier in this Guidance Note.
- User will also need to review all floors and ensure that the correct *Connects floor* condition has been specified for each floor. During the upgrade process FR5 will attempt to specify the correct *Connects floor* value for each floor but this mapping process will not be completely accurate. Upper levels will need to be check in particular because these floors will not be specified as *as drawn* during the upgrade process. Any floors that have two conditions underneath it (e.g. a cantilevered zone on the upper level with elevated and as drawn areas) will need to be correctly split and the appropriate *Connects floor* values will need to be specified for each area. It is essential that the user reviews the upgraded file and ensures that the correct

condition for each floor has been specified otherwise the upgraded file may fail to calculate. See page 11 of this document for further information about specifying *Connects floor* values.

- Due to new functionality introduced in v5.2.10, the project levels will be automatically aligned during the upgrade process. To avoid any level misalignment, make sure levels are aligned in the older project prior to upgrading the project to v5.2.10; this can be done by using the Level Alignment Point tool and clicking the Align Levels button once any level alignment points are correctly placed.
- If you want to retain a copy of the v5.2.09 project file SaveAs a modified file name as soon as you dismiss the Upgrade Dialogue Box.

Further Reading

- Please refer to the FR5 User Manual (v5.2.10) for further detail. The FR5 User Manual is a PDF document that can be opened by clicking on User Manual under Help on the File menu.

- Please also refer to FAQs on the FirstRate5 website (www.fr5.com.au/faqs)