

# **FINE4Rate**

## **Quick Start Guide**

1. Installation – Launching
2. BIM Interface
3. Example



# Preface

This Quick Start Guide provides a fast and friendly introduction on FINE4Rate main features and functionalities.

FINE4Rate is the BIM Solution for the NATHERS Thermal Comfort Modelling, which provides advanced modelling capabilities in an easy to use BIM interface, combining the AutoCAD functionality with the DWG & IFC full compatibility. The program uses its 3D BIM interface to provide the NATHERS Energy Accessor the capability to automatically populate all building and zone data straight from the 3D model into the data entry fields of Accurate Sustainability. The friendly BIM interface of FINE4Rate allows the assessor to spend time, a fraction of the otherwise required, to thermally engineer dwellings rather than spending it on endless hours of data entry.

FINE4Rate is the only BIM Powered Software that provides the Energy Accessor with a true 2D-3D drawing environment that is using DWG as its native file format. The assessor can import IFC files of the building 3D model produced by the building designer directly into the traditional Accurate Sustainability fields. FINE4Rate includes also all the CAD features of 4MCAD, a fully functional 2D/3D CAD software which is also known as the smart alternative to AutoCAD.

Despite its numerous capabilities, FINE4Rate has been designed in order to be very easy to learn. This quick guide is divided into three short parts:

- Part 1 describes the installation procedure and the main menu structure.
- Part 2 deals with the BIM interface of FINE4Rate, showing its philosophy and main features.
- Part 3 shows an example which makes clear the whole process.



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# 1. Installation - Launching

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## 1.1 Installing FINE4Rate

1. Insert the CD in your computer CD-ROM drive (e.g. D:, E:) or, if you received your software via Internet, run the installation application you downloaded.
2. When the Setup window appears, choose the language for the installation and click OK.
3. When the Welcome page appears (as shown below), click **Next**.



4. When the License Agreement appears, read it carefully. If you agree with the terms, check the respective "radio button" and then click **Next** (you must agree with the terms to proceed with the installation).
5. In the next screen enter your username and organization information and check if you want to create a desktop icon. Then click **Next** to see if the information is correct (see the following window) and finally click **Install** for the installation procedure to begin.
6. Then the program will ask you to select the folder <AccuRateSustainability> where the AccuRate Libraries are located.
7. Upon completion of the installation procedure, the following last window appears on screen and all needed is to click **Finish**. In case that the **Run FINE4Rate** checkbox is selected, the program will start running.



8. After installation, the program is located within the programs list.

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## 2. CAD Component

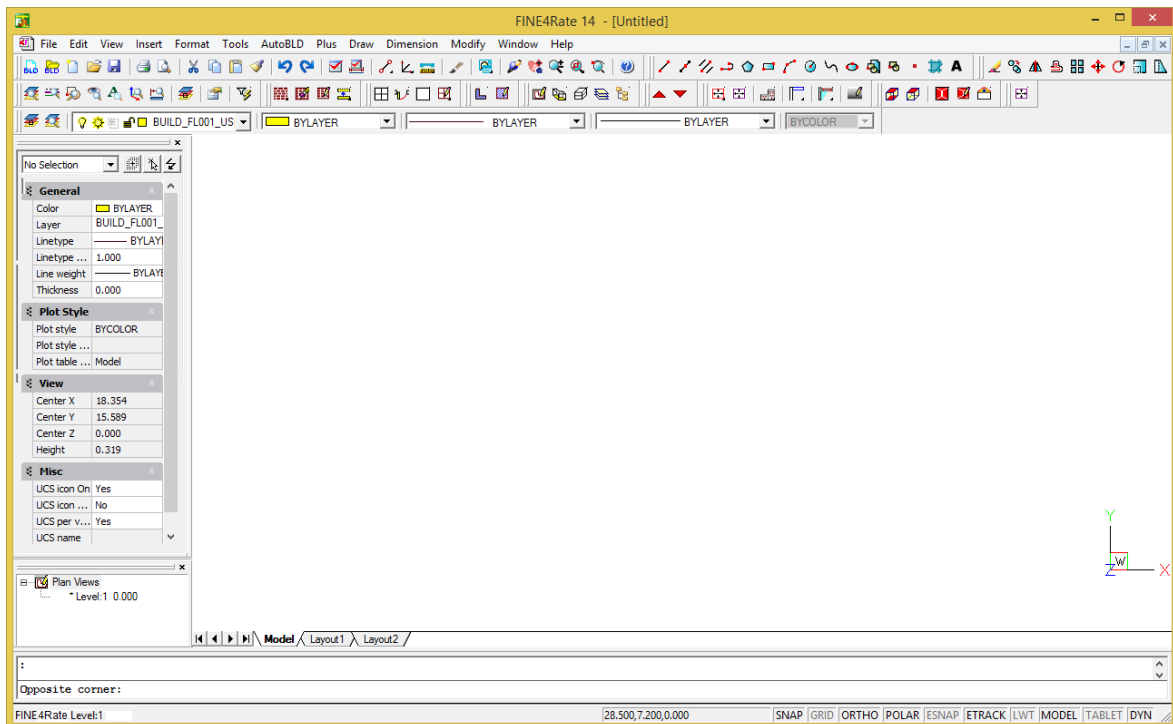
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### 2.1 Overview

FINE4Rate is a powerful BIM workstation which produces the XML file directly from the building model. This first Part (Part I) of the user's guide describes the operation of the BIM interface of FINE4Rate. This BIM interface considers the building as being composed of intelligent entities with their own attributes and properly related each one to each other.

### 2.2 Main menu

As soon as the program is loaded, the main menu screen appears for the first time:



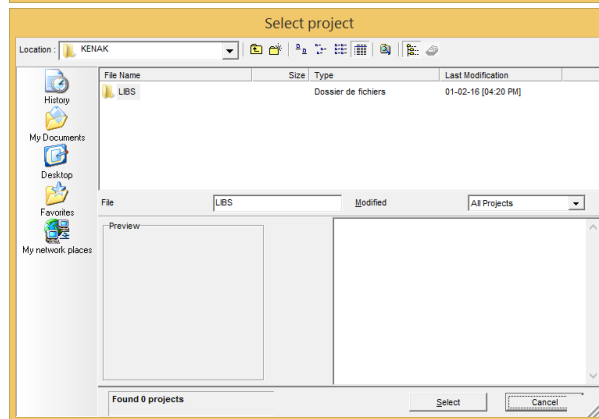
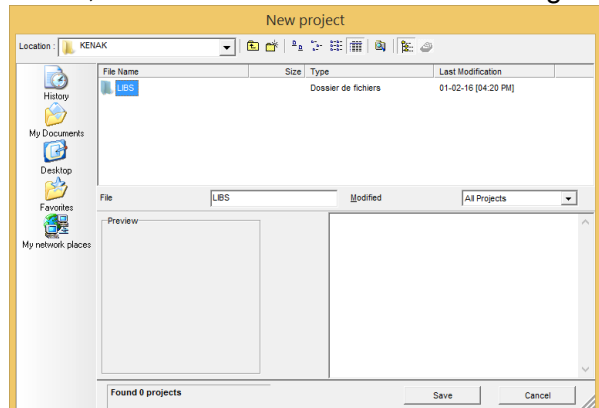
Among the commands of the designing environment, we notice the following main options of the package:

1. Project files management options (New Project, Open Project and Project Information) which are located into the options group **FILE**.

2. Option Group with the name **AutoBLD**, which includes all the commands required for the building design.
3. Auxiliary option group with the name **PLUS**, which contains a series of designing facilities for the user.

Starting with FINE4Rate, you define a new project through the corresponding option in the FILE menu mentioned above. In case that "New project" is selected, a window appears on the screen where the name of the Project should be typed.

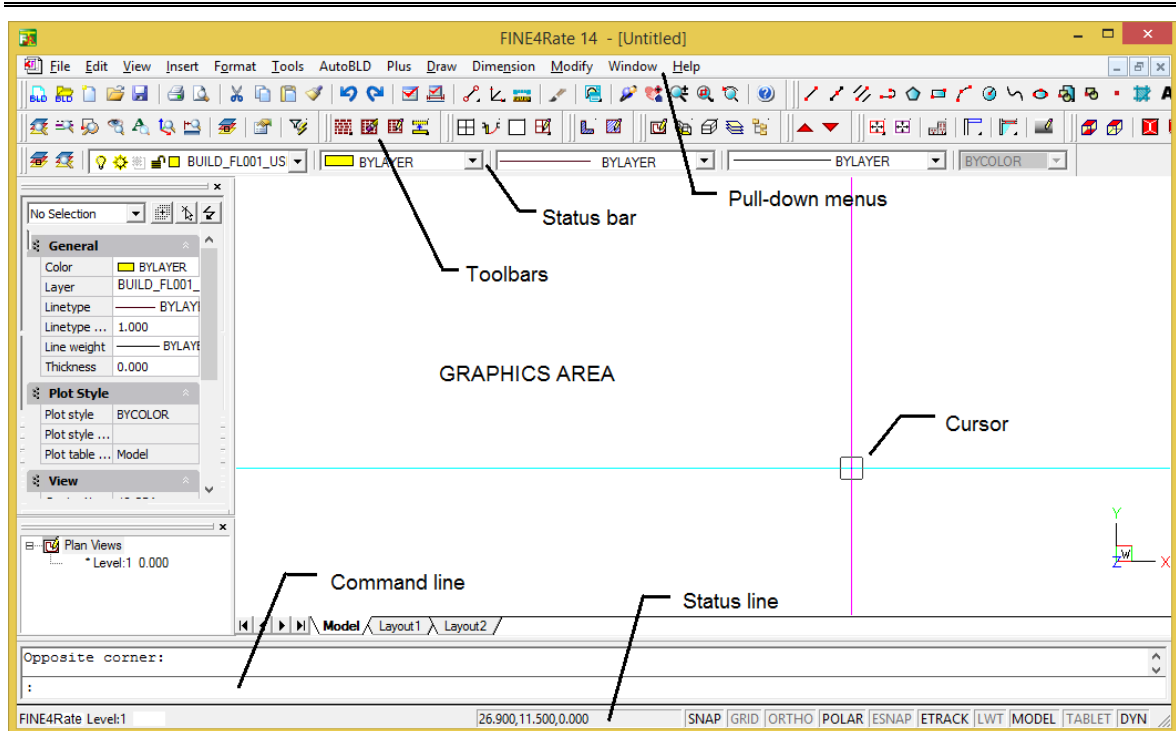
**In order to "load" an existing project**, which has been created with the program and you want to further edit it or just view it, you select "Select Project", and a list with the existing projects in the hard drive will be displayed on the screen. At first, the list displays all the projects that exist in the FINE4Rate directory and with the use of the mouse or the keyboard and acting correspondingly, you can transfer to any other directory, viewing at the same time the existing projects. It is noted that the projects are included into directories with the extension BLD. If an existing project is selected, it is loaded and displayed on the screen.



Either if a new project is created or a saved one is loaded, you can start working with the use of the subsystem commands described above. A detailed description of these commands is available in the following chapters. Before this detailed description, a short reference of the basic designing principles featured in the designing environment of the package is recommended, in chapter 2.3 that follows next. If you are familiar with the use of 4MCAD or AutoCAD, you may page through or even skip this chapter, while if you are not, you should read it carefully.

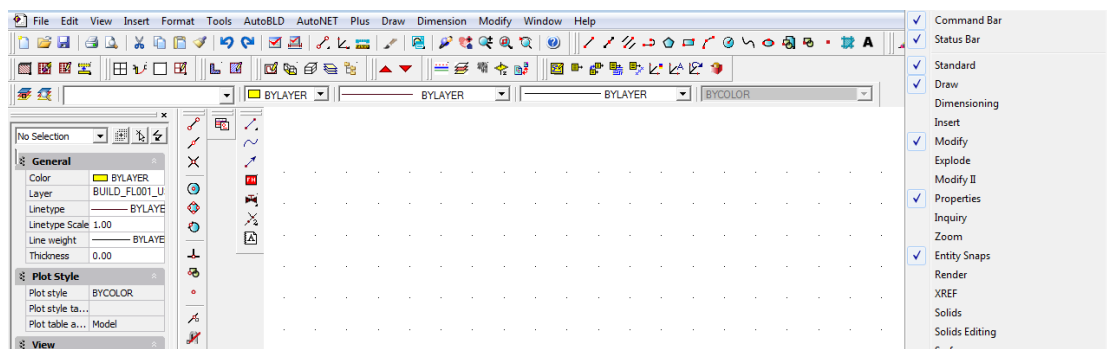
## 2.3 Drawing Principles & Basic Commands

A great advantage of the package is that the structure and the features of the drawing environment follow the standards of the CAD industry adopted by AutoCAD, 4MCAD etc. In particular, the available working space is as follows:



As shown in the above figure, the screen is divided into the following "areas":

- **Command line:** The command line is the area where commands are entered and the command messages appear.
- **Graphics area:** The largest area of the screen, where drawings are created and edited.
- **Cursor:** The cursor is used for drawing, selecting objects and running commands from the menus or the dialog boxes. Depending on the current command or action, the cursor may appear as a graphics cursor (crosshairs), a selection box, a graphics cursor with a selection box etc.
- **Pull-down menus:** Each time you select one of these commands (AutoBLD, AutoNET etc.) a pull-down menu is shown.
- **Status Line:** It is the line on the bottom of the screen where the current level, the drawing status and the current cursor coordinates are displayed. From the status line you can enable or disable tools such as SNAP, GRID, ORTHO etc., which are explained in the following chapter.
- **Toolbars:** You can arrange which toolbars you want to be shown in the screen in each project. To enable or disable a toolbar, in the upper part of the screen (where the existing toolbars are shown) right click with the mouse and select the desired toolbar from the list (as it is shown below).



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Apart from that, each time you select an application from the AutoNET menu, a toolbar with the name of the application is shown and you can either work from there or from the AutoNET commands.

### 2.3.1 Drawing aids

This section describes the most important drawing aids. These are the commands:

**SNAP:** The graphics cursor position coordinates appear in the middle of the upper part of the graphics area. If "Snap" is selected, the graphics cursor movement may not be continuous but follow a specific increment (minimum movement distance). To change the increment, right click with the mouse on "SNAP" and choose "Settings". To activate or deactivate it, double click on the "SNAP" icon.

**GRID:** The screen grid is a pattern of vertical and horizontal dots, which are placed at the axes intersection points of an imaginary grid. The grid can be activated or deactivated by clicking the corresponding icon or by pressing **F7**.

**ORTHO:** The "Ortho" feature restricts the cursor to horizontal or vertical movement. The status bar shows whether the "Ortho" command is activated by displaying "ORTHO" in black characters. The command is activated or deactivated by clicking the corresponding icon or by pressing **F8**.

**ESNAP:** The "Esnap" command forces the cursor to select a snap point of an object, which is within the Pick box outline. The esnap points are characteristic geometric points of an object (i.e. endpoint of a line). If you have specified a snap point and move the cursor close to it, the program will identify it with a frame. The "Esnap" command can be activated either by holding down the "SHIFT" key and right clicking the mouse or through the additional toolbar.

### 2.3.2 Drawing Coordinates

When you need to determine a point, you can either use the mouse (by seeing the coordinates in the status bar or using the snap utilities), or enter the coordinates directly in the command line. Moreover, you can use either Cartesian or polar coordinates and absolute or relative values, in each method (relative coordinates are usually more convenient).

**Relative coordinates:** Enter the @ symbol (which indicates relative coordinates) and then the x, y, z coordinates (Cartesian system) or the  $r<\theta<\phi$  coordinates (polar system) in the command line. The system used (Cartesian or polar) is defined by the "," or "<" symbol respectively. If you do not insert a value for z or  $\phi$ , it will be automatically taken as zero. For example, if you are prompted to locate the second (right) endpoint of a 2m horizontal line, you enter:

@2,0 if you use the Cartesian coordinates (which means that the distance of the second point from the first is 2 m on the x axis and 0 m on the y axis), or

@2<0 if you use the polar coordinates [which means that the second point is at a distance of 2m ( $r=2$ ) and an angle of 0 degrees ( $\theta=0$ ) from the first].

**Absolute coordinates:** They are specified in the same way as the relative coordinates but without using the @ symbol. The absolute coordinates are specified in relation to the 0,0 point of the drawing.

The measurement system can be activated, deactivated or changed with the **F6** key.

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### 2.3.3 Drawing Basic Entities

In the "**Draw**" menu you will find the basic drawing entities:

**Line:** "Line" option is used for drawing segments. When you select "Line" from the menu or type "Line" in the command line, you will be prompted to specify a start point (by left clicking or by entering the point coordinates – relative or absolute – in the command line) and an endpoint (determined in the same way).

**Arc:** The "Arc" command is used for drawing arcs. An arc can be drawn in different ways: the default method is to specify three points of the arc ("3-Points"). Alternatively, you can specify the start point and endpoint of the arc as well as the center of the circle where it belongs (St, C, End). You will not find it difficult to understand and become familiar with the various methods of drawing an arc.

**Polyline:** This command allows you to draw polylines, which are connected sequences of line or arc segments created as single objects. The command is executed by either using the menu or typing "pline" in the command line. You will be prompted to specify a start point and an endpoint (by right clicking the mouse or by entering the point coordinates – relative or absolute – in the command line). Then, the command options will appear (Arc, Close, Length etc). Select **A** to switch to Arc mode, **L** to return to Line mode and **C** to close the polyline.

### 2.3.4 Useful Commands

This section includes brief descriptions of the basic program commands, which will be very useful. These are the commands "Zoom", "Pan", "Select", "Move", "Copy" and "Erase" (you will find them in "View" and "Modify" menus). In particular:

**Zoom:** "Zoom" increases or decreases the apparent size of the image displayed, allowing you to have a "closer" or "further" view of the drawing. There are different zooming methods, the most functional of which is the real-time zooming ("lens /  $\pm$ " button). You can use the mouse to zoom in real time – that is to zoom in and out by moving the cursor. There are a number of zoom options as shown by typing "Zoom" in the command line: All/Center/Dynamic/Extents/Left/Previous/Vmax/window/<Scale(X/XP)>.

**Pan:** "Pan" ("hand" icon) moves the position of the visible part of the drawing, so that you can view a new (previously not visible) part. The visible part of the screen moves towards the desired area and to the desired extent.

**Select:** This command selects one or more objects (or the whole drawing), in order to execute a specific task (erase, copy etc.). Select is also used by other CAD commands (for example, if you use the "Erase" command, "Select" will be automatically activated in order to select the area that will be erased).

**Move:** This command allows moving of objects from one location to another. When the "Move" command is activated, the "Select" command is also activated so that the object(s) you want to move (in the way described in the previous paragraph) can be selected.

After you have selected the desired object(s), you are prompted to specify the base point (using the snap options), which is a fixed point of the drawing. When you are prompted to specify the position where the base point will be moved, use either the mouse or the snap options. After you have completed this procedure, the selected object(s) will move to the new position. Please note that the base and the new location points can be also specified with the use of coordinates (absolute or relative, see related paragraph).

**Copy:** The "Copy" option allows the copying of objects from one location to another. The "Copy" procedure is similar to the "Move" procedure and the only difference is that the copied object remains at its original location in the drawing.

**Erase:** Choose this option to delete objects. The procedure is simple: Select the objects you wish to erase (as described above), type "E" in the command line and press <Enter>. Alternatively, you may first type "E" in the command line, then select the object(s) by left clicking and finally right click to erase the object(s).

**DDInsert (Insert Drawing):** This command allows you to insert another drawing (DWG file) or block in the drawing. When this command is selected, a window appears in which you select block or file and then select the corresponding block or file from disk. Then you are prompted to specify the insertion point, the scale factor etc., so that the selected drawing is properly inserted.

**Wblock:** The "Wblock" command allows us to save part of a drawing or the entire drawing in a file, as a block. When this command is selected, you are prompted to enter the file name and then you select the drawing or the part of the drawing you wish to save. The use of this command is similar to the "Screen Drawing" command in the AutoBLD menu, which will be described in a following section. In order to insert a block in a drawing, you use the "ddinsert" command described above.

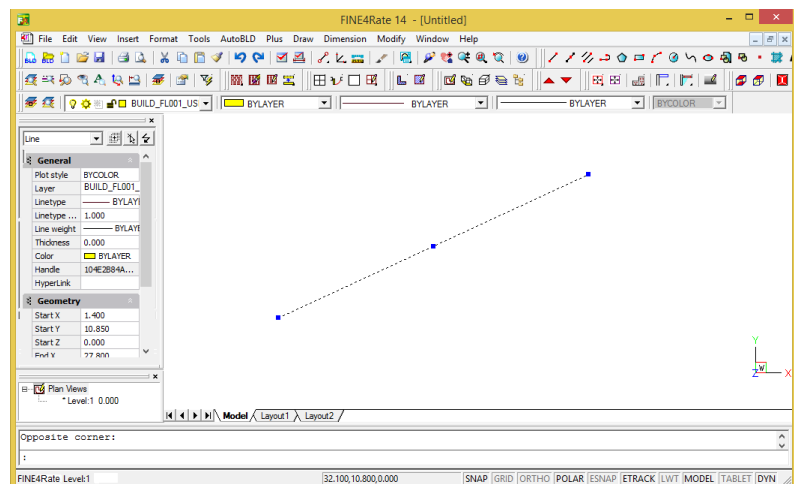
**Explode:** The "Explode" command converts a block in a number of simple lines so that you can edit it in that form. If it is selected, the program will prompt you to select the block ("Select object") you wish to explode.

### 2.3.5 Grips

Grips are some characteristic points of an object, which appear after it is selected (by moving the cursor on the object and left clicking). The object is displayed with grips (small squares in blue colour), which mark control locations and are powerful editing tools (by selecting one grip you can for example, move or change the length of the line). When you click a grip, the following prompt appears in the command line:

**\*\*STRETCH\*\*** <stretch to point> /Base point /copy/ undo/ exit. If you press <Enter> (or right click), the first characters of the corresponding word are entered, e.g. "sc and enter" for the "Scale" command).

When a command is executed, grips disappear and the objects are deselected. If the command is an editing command (correction or copy), which can be preselected, the objects take part in the execution of the command automatically. In this case, the command overrides the "Select objects" prompt and proceeds. To deselect grips and objects you should press <Esc> twice: once to deselect the objects and twice to deactivate the grips.



In each object the positions of the grips are different. Namely, for a point the grip is the point itself, for a segment the grips are the midpoint and the two endpoints, for an arc the midpoint and the two endpoints, for a circle the center and the quadrants, for a polyline the endpoints of the line and arc segments and the midpoints points of the arc segments, for a spline the spline points, for a block the insertion point, for text the insertion point etc.

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### 2.3.6 Print

This section may be read after you have created a drawing and you want to print it. Any drawing can be printed using a printer or plotter or to a file. Printing is performed using "PLOT" command, selected either from the "FILE" menu or typing it in the command line, provided there is a drawing already loaded.

Viewing a drawing before printing gives you a preview of what your drawing will look like when it is printed. This helps you see if there are any changes you want to make before actually printing the drawing.

If you are using print style tables, the preview shows how your drawing will print with the assigned print styles. For example, the preview may display different colours or line weights than those used in the drawing because of assigned print styles.

#### To preview a drawing before printing


1. If necessary, click the desired Layout tab or the Model tab.
2. Do one of the following:
  - Choose File > Plot Preview.
  - On the Standard toolbar, click the Plot Preview tool .
  - Type ppreview and then press Enter.
3. After checking the preview image, do one of the following:
  - To print the drawing, click Plot to display the Print dialog box.
  - To return to the drawing, click Close.

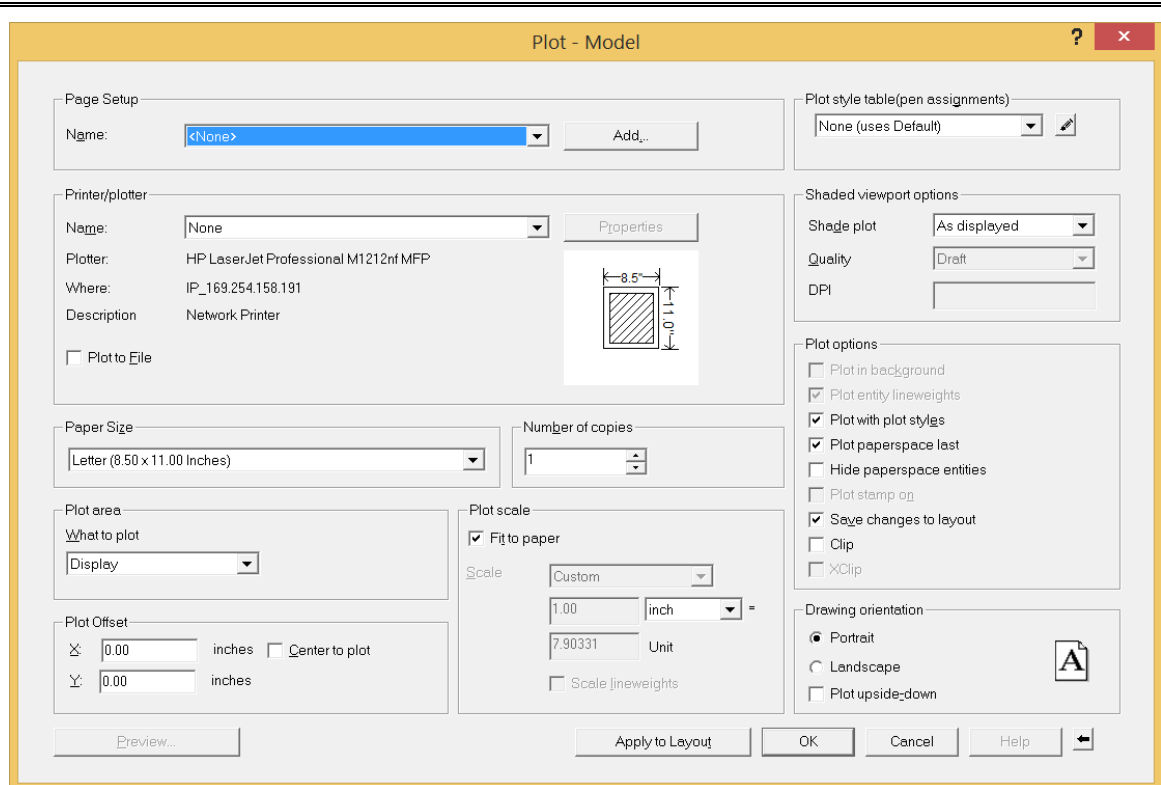
The Plot dialog box is organized in several areas as it is shown in the picture below. For help defining print settings before you print, see Customizing print options.

In the plot window, you can select the printer, the paper size and the number of copies and several plot options such as the style (pen assignments), the orientation etc.

Moreover, you can select the plot scale and the plot area. Before you proceed to printing, you select "Apply to layout" and then "Preview" so as to make any modifications you might want.

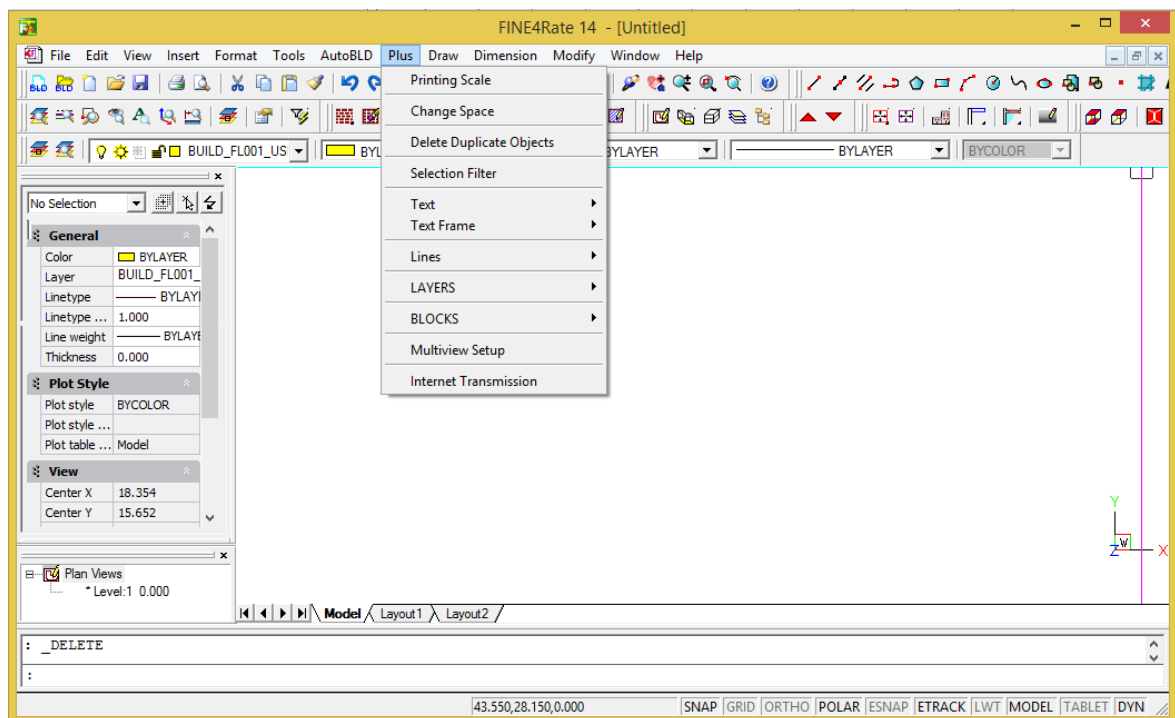
#### To print a drawing

1. If necessary, click the desired Layout tab or the Model tab.
2. Do one of the following:
  - Choose File > Plot.
  - On the Standard toolbar, click the Print tool (). If you click the Print tool, the Print dialog box does not display. Your drawing will be sent directly to the selected printer.
  - Type print and then press Enter.
3. From the Plot dialog box, make any adjustments to the settings.
4. Click OK.



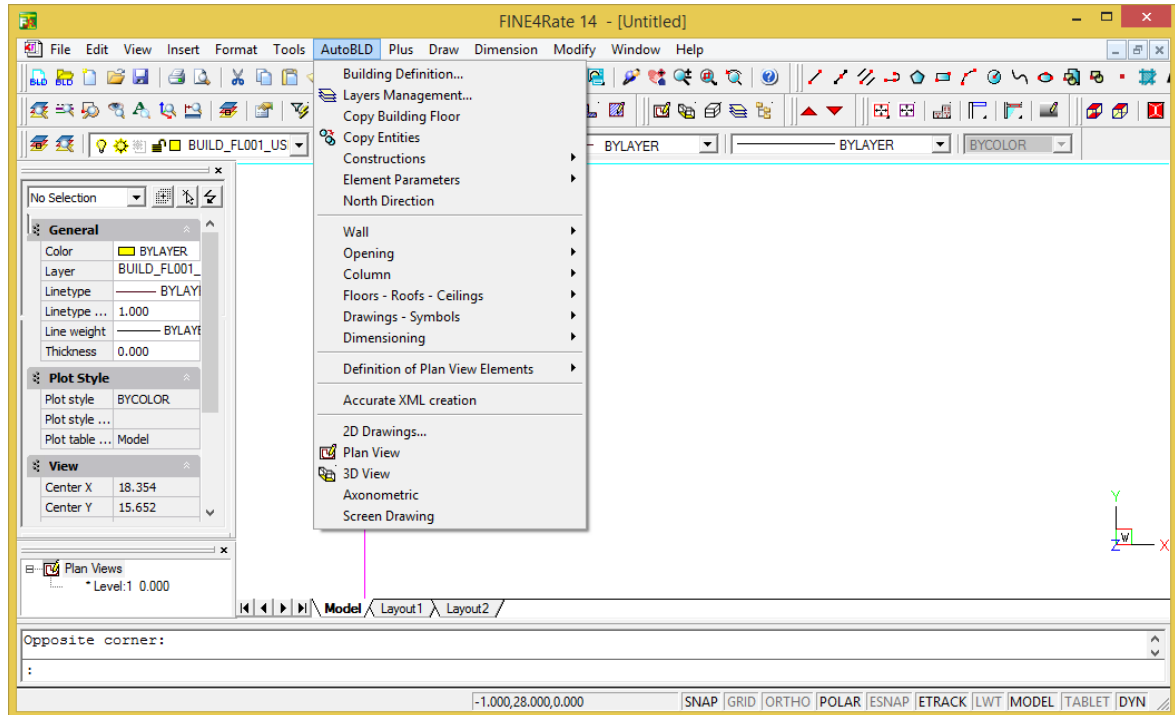
## 2.3.7 Plus Drawing Tools

Those tools belong to the large group of options under the general menu PLUS. These are a series of additional drawing tools, which have been embodied in the package in order to help the user during drawing.



## 2.4 AutoBUILD: Building Design

The AutoBLD group of commands, includes all the facilities required to insert/define a building following a BIM philosophy. As it is shown below, the various options/commands are divided into sub-groups.

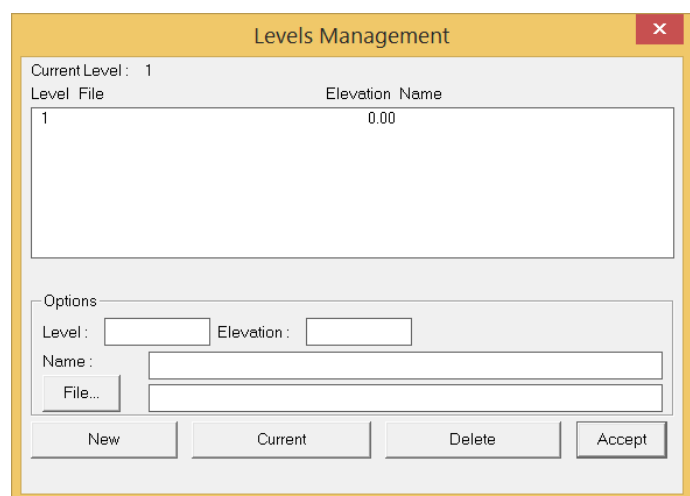


In general, the first sub-group includes commands for the definition of the project parameters, the second and the third sub-group includes drawing commands, the fourth sub-group includes commands for linking to the calculations, and the fifth sub-group includes management options for the AutoBLD libraries and commands for the building supervision. In the following sections, the options reported above are described one by one, starting from the "Building Definition" option.

### 2.4.1 Building Definition and Layers Management

As soon as you select the "Building Definition" command, the levels management menu appears.

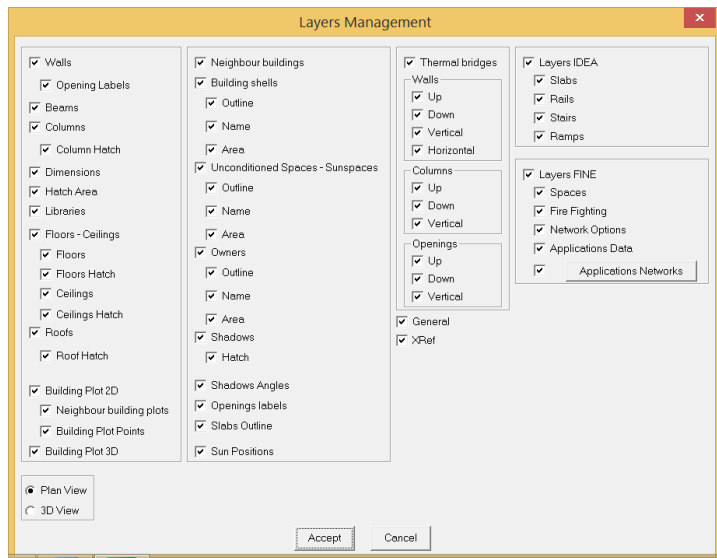
On this screen the levels of the project building are defined, which means that you have to determine the level and the corresponding architectural drawing (plan view-as xref) (DWG file) of each building floor (only in case you use a drawing that was created by another architectural designing program). More specifically:



- In the "Level" field, define the level (floor) number (always starting with the number "1").
- In the "Elevation" field, define the height of the floor level. You can define manually a benchmark for level measurement (e.g. the pavement). You can also define negative levels (e.g. -3 m for the basement).
- In the "Name" field, you give a name for each level.
- In the "File" field, define the path and the name of the relevant DWG drawing-file, only if you refer to an already existing drawing (which means that you do not intend to draw the plan view from scratch). If there is no DWG architectural drawing available, leave this field empty.

The insertion and the management of plan views are performed with use of the xref command. At the bottom of the dialog box there are three functions available which are used to manage the level files. Specifically:

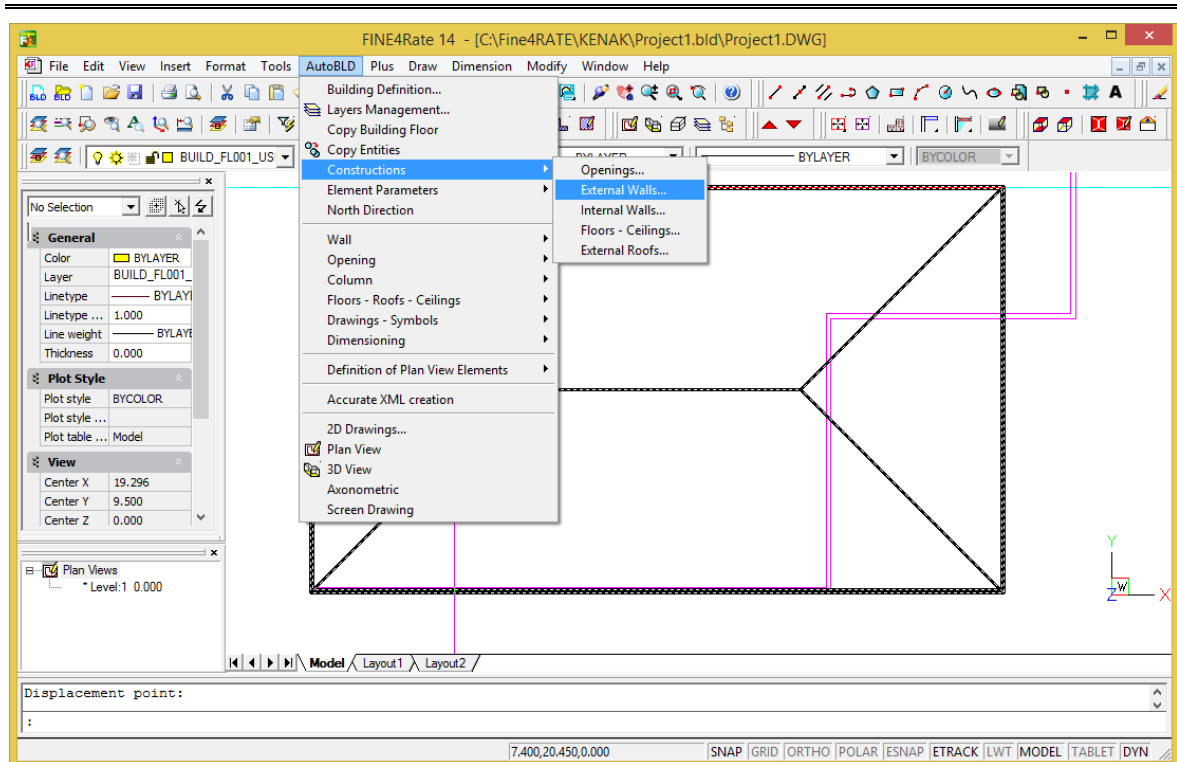
- Press the "New" button to save a new level or save the changes in the data of a level (e.g. elevation, DWG drawing).
- Use the "Current" option to select the plan view/file you want to work on each time.
- Select the "Delete" option to delete the level you want (after you have it selected). The "Delete" command removes the plan view of the relevant level in the project without deleting the original architectural DWG file.
- The "Accept" command closes the dialog box (it does not save the floor data. This can be managed with the "New" command). FINE4Rate enables also the use of a "scanned" ground plan, which is a ground plan in a bitmap file created by a scanner.



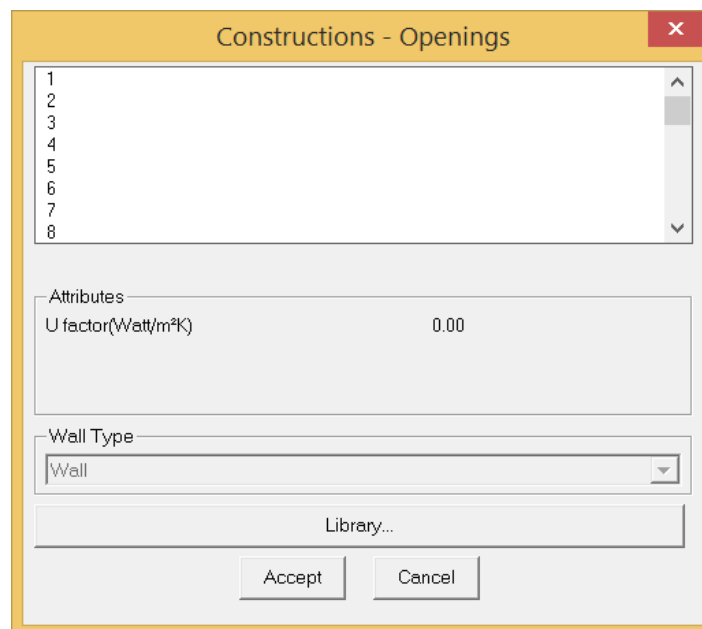
The "Layers Management" option gives you the choice to enable or disable in a quick and practical way (during working) several layers. If you want, you can disable any element group by simply clicking inside the indicator-box of the corresponding group. When the box is checked, the corresponding group is enabled.

## 2.4.2 Constructions

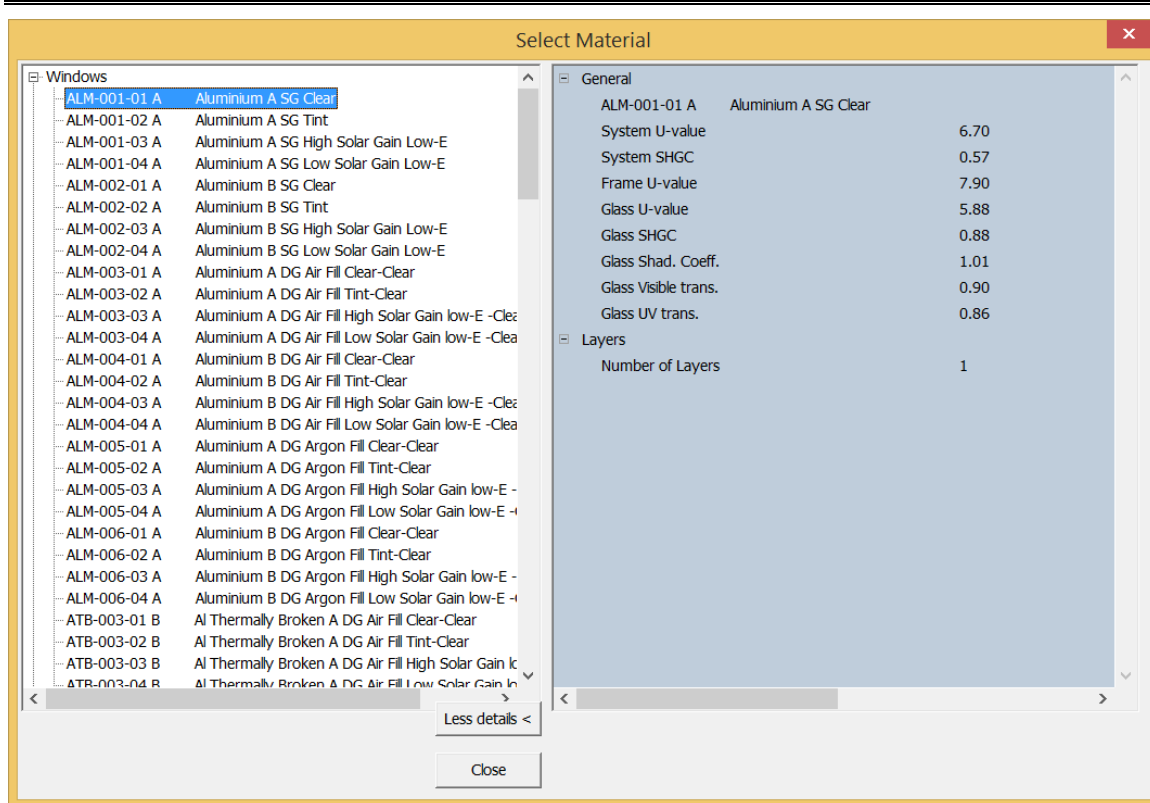
As shown below, this command leads to the basic building envelope elements (Walls, Openings and Floors/Ceilings) where the user has to define the constructions (material libraries) to be used for the specific project by selecting properly the respective items out of the AccuRate material libraries.



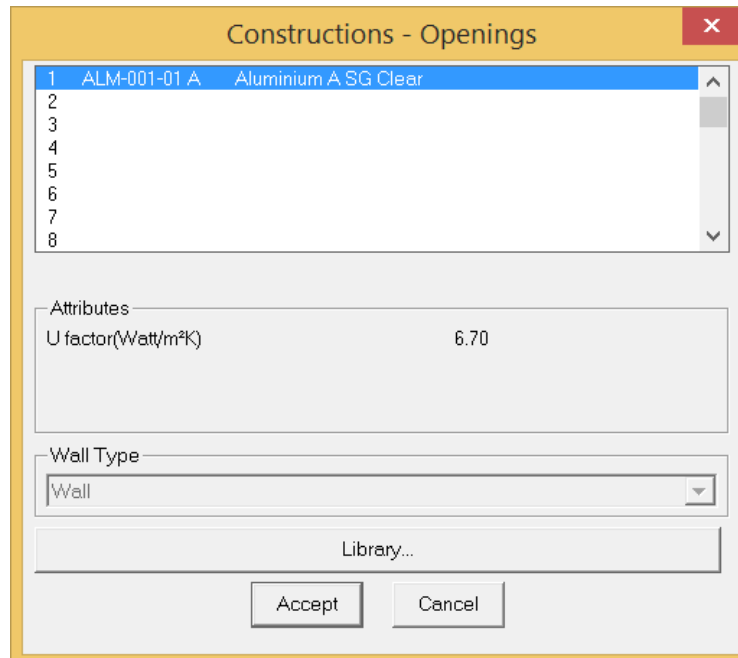
For example, by selecting “Openings” the following window with an empty list of types of Openings (for both Windows and Doors) appears on screen:



The user has to press the “Library” button at the bottom to select the appropriate materials.



By double clicking on an item, the respective material is transferred from the AccuRate libraries to the project Openings.

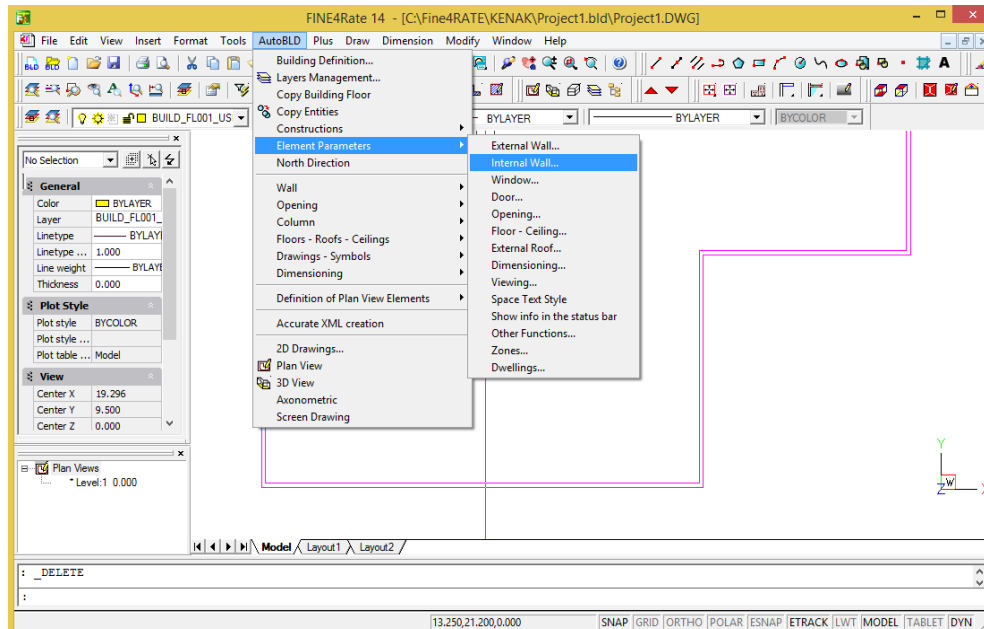


Same is the procedure concerning the walls and the other elements.

Through this process, the user prepares the construction libraries for the specific project he/she is working on.

### 2.4.3 Element Parameters

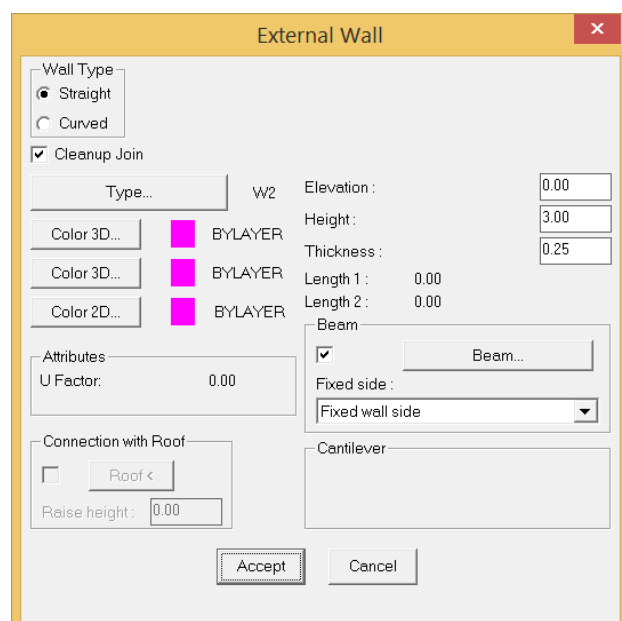
Through this command, the user can define the default values for each element type concerning the specific project. In particular, these values will serve as default values for the drawing commands which are described in the next paragraph. The user can skip this step since he/she can also define those values directly within the dialog boxes of the drawing commands themselves.



### 2.4.4 Drawing Walls

AutoBLD menu contains all the commands required for drawing and editing walls, such as parallel moving of walls, trimming, extending, joining and breaking walls as well as placing openings of any kind on them (windows, sliding doors, openings, arches). During the initial drawing, as well as during any modification at any stage, the drawing is automatically updated (e.g. placing an opening on a wall does not break the wall in two parts, the opening moves easily from side to side whether you are working on the ground-plan or on a 3D view and the wall is restored without leaving undesirable lines after deleting an opening etc.).

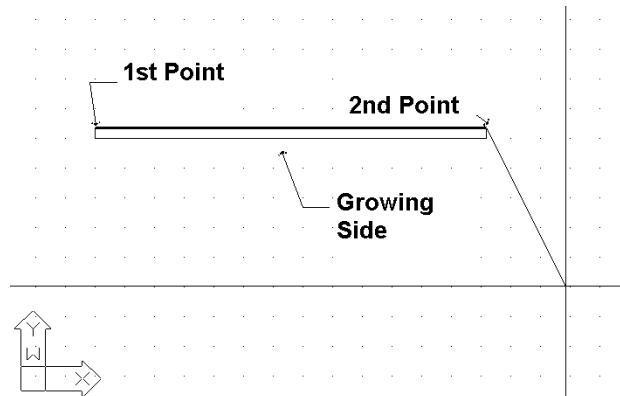
The **Wall** option, located at the second subgroup of the AutoBLD group of commands, includes the External, Internal, External wall from polyline, Internal wall from polyline and Outline options as well as the option subgroup Modify, Delete, Extend, Break, Join, Trim and Move. The first subgroup concerns the wall drawing, while the second their further processing after being drawn. By selecting External Wall, first of all its attribute dialog appears with a series of parameters (type, dimensions, colours etc.).



In order to start drawing a wall, you click OK and then follow the instructions shown below:

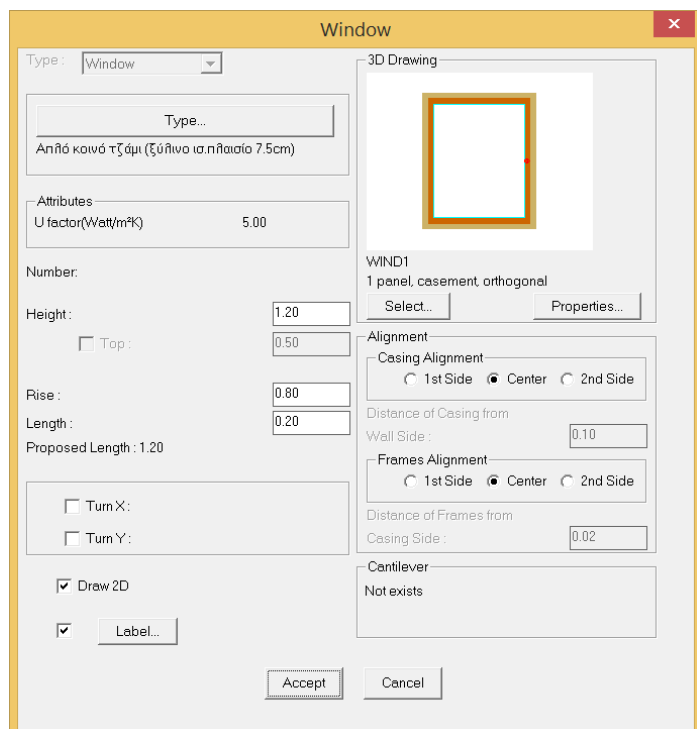
**External wall (straight / arc):** After activating the command (by pressing <Enter> in the menu), you are required to successively provide:

- i) the starting point of the wall (the application message in the command prompt is: *"Wall start \ Relative to wall \ Toggle shape <Linear>"*)
- ii) the ending point of the wall (the application message in the command prompt is *"Wall end \ Relative to wall \ Toggle shape <Linear>"*)
- iii) the direction towards which the wall shall grow, by providing any point on one of the two half-planes defined by the wall line (the application message in the command prompt is *"Enter Side Point"*).



After the above actions, you can see that the wall has been drawn and that you can continue to draw another wall starting from the ending point you defined earlier, unless you right click, which means that you want to stop (or press "ENTER"). You can change the wall drawing from linear into circular, typing **T** in the following program prompts and pressing <Enter>. During drawing, one can come to the conclusion that the ability of drawing consecutive walls is very convenient since it prevents you from making many movements. As mentioned further below, in the "Element Parameters" section, the thickness of the wall, its height and its level in relation to the floor level (when the level is 0, the wall starts from the floor), are stored within the "Element Parameters" for the wall. By providing proper values for the wall height and level, any possible case of walls of unequal height can be dealt with.

Further to the drawing functions, the program also provides powerful editing tools, such as erase, modify (through the wall dialog box), multiple change etc. Two other commands that are widely used while drawing the walls are a) the Undo command, which enables you to reverse the previous command executed and b) the Properties command, which enables you to view (and change) the attributes of the selected wall.



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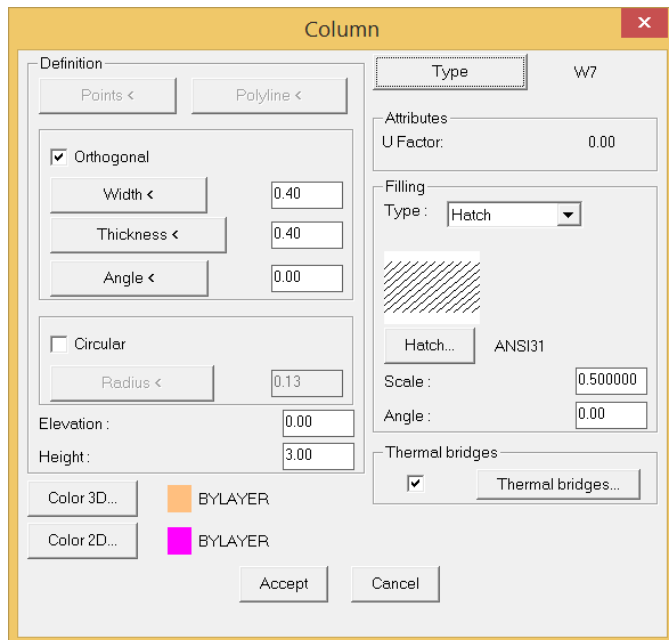
## 2.4.5 Drawing Openings

Once the command "Opening" is activated, a second option menu is displayed, including a variety of opening types (window, sliding door, door etc) to draw, plus also a set of editing functions such as "Erase", "Modify" or "Move", applied to existing openings. Besides, at the bottom of this menu lies the option "Libraries", which enables the user to define his/her own opening freely, to create various shapes of windows.

**Window:** The option "Window" demands that you select the wall on which the opening will be placed and then define the beginning and the end of the opening (all these actions are carried out using the mouse and pressing <Enter> each time). The window will automatically obtain the data that are predefined in the "Attributes", namely the corresponding values for the height, the rise, the coefficient k etc). Of course, you can draw the window from the ground plan as well as in the three-dimensional (3D) view. During drawing a window, it is very helpful to the user the fact that, after the wall where the window will be automatically placed is selected, the distance from the wall edge is displayed in the coordinates position on the top of the screen, while the crosshair is transferred parallel to the wall for supervision reasons. The measurement starting point (distance 0) as well as the side (internal or external) are defined by which one of the two edges is closer and which side was "grabbed" during the wall selection. Similar functionality exists for other types of openings, such as Sliding Doors, Doors, Openings etc.

## 2.4.6 Columns

The insertion of a column is made through the Column -> Placement command which activates the following dialog:



The user has to select the type of Column and then to define its geometry through its shape (Orthogonal or Circular) and dimensions.

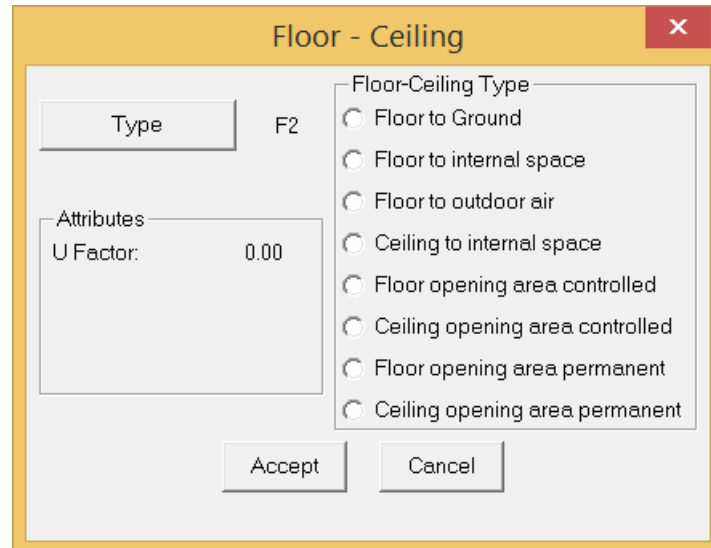
The Column is an object that can be moved, copied, erased etc. It is also editable through the command Column -> Modify.

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## 2.4.7 Floors – Ceilings – Roofs

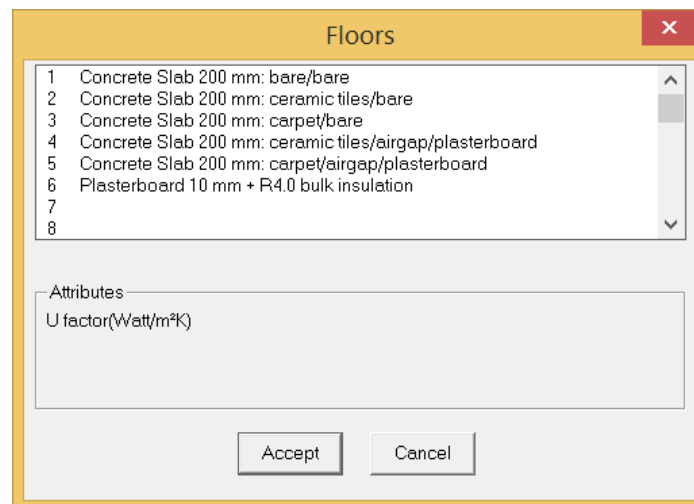
### I. Floors – Ceilings

This group of commands includes the drawing and modification of Floors, Roofs and Ceilings as well as Floor and Ceiling Opening areas. First of all, a Floor or a Ceiling is defined by its type with respect to the ground/space it is in contact with (for example a “floor to the ground” or a “floor to the interior” etc) and its construction.



The "Floor - Ceiling" dialog box is shown. It has a title bar with a close button (X). Inside, there is a "Type" button and a text field containing "F2". Below this is an "Attributes" section with a "U Factor:" label and a text field containing "0.00". To the right, there is a "Floor-Ceiling Type" section with a list of radio button options: "Floor to Ground", "Floor to internal space", "Floor to outdoor air", "Ceiling to internal space", "Floor opening area controlled", "Ceiling opening area controlled", "Floor opening area permanent", and "Ceiling opening area permanent". At the bottom, there are "Accept" and "Cancel" buttons.

By clicking on the “Type” (*Construction*) button, the user can select the respective Floor material.

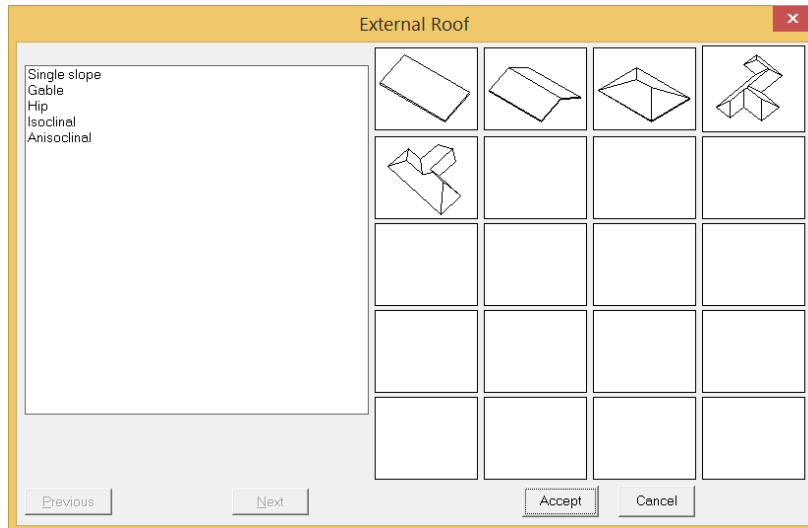


The "Floors" dialog box is shown. It has a title bar with a close button (X). Inside, there is a list box containing the following items: "1 Concrete Slab 200 mm: bare/bare", "2 Concrete Slab 200 mm: ceramic tiles/bare", "3 Concrete Slab 200 mm: carpet/bare", "4 Concrete Slab 200 mm: ceramic tiles/airgap/plasterboard", "5 Concrete Slab 200 mm: carpet/airgap/plasterboard", "6 Plasterboard 10 mm + R4.0 bulk insulation", "7", and "8". Below the list box is an "Attributes" section with a "U factor(Watt/m²K)" label and a text field. At the bottom, there are "Accept" and "Cancel" buttons.

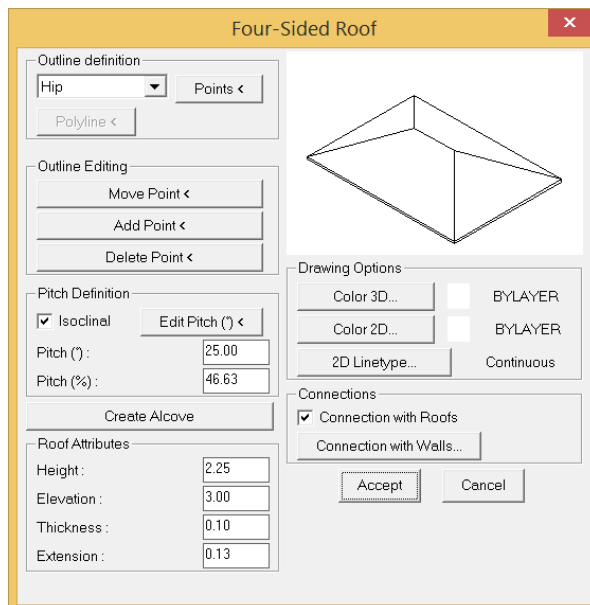
To draw a floor or a ceiling the user has either to select a polyline or to enter the points in order to define the surface of the floor or ceiling.

## II. Roofs

In the case of defining a Roof, there are two options, A flat roof were the user selects its construction (similar to floors and ceilings), or an inclined Roof, were the user selects among a set of types of roofs and then also selects its construction.



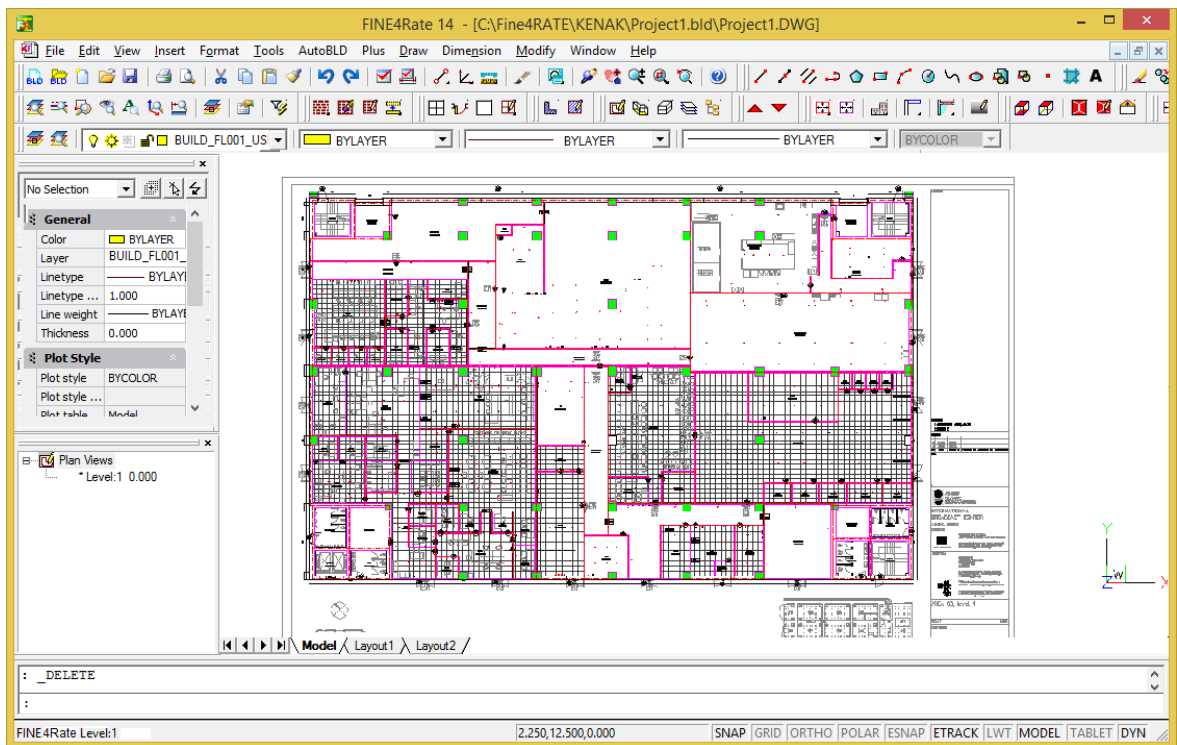
The definition and/or editing of a Roof is performed through the appropriate dialog (like the one below for the “Four-sided Roof”).



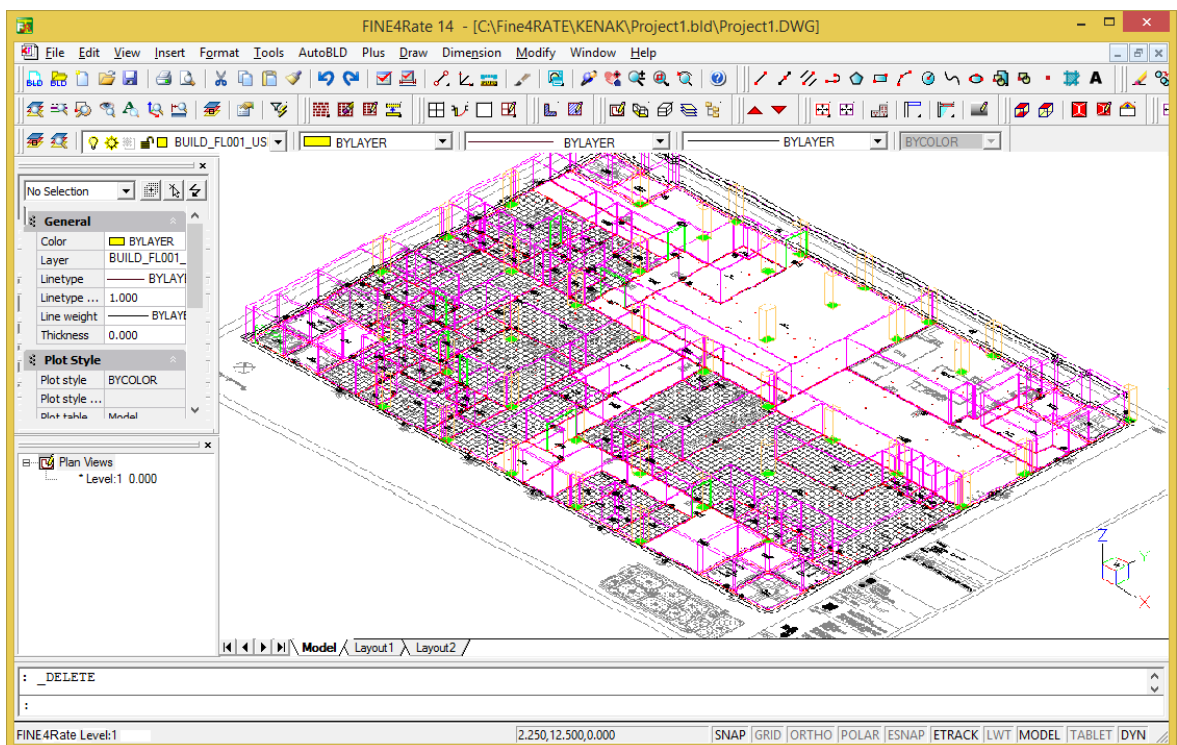
### 2.4.8 Viewing Commands

The Building model of a FINE4Rate project can be viewed through the following commands:

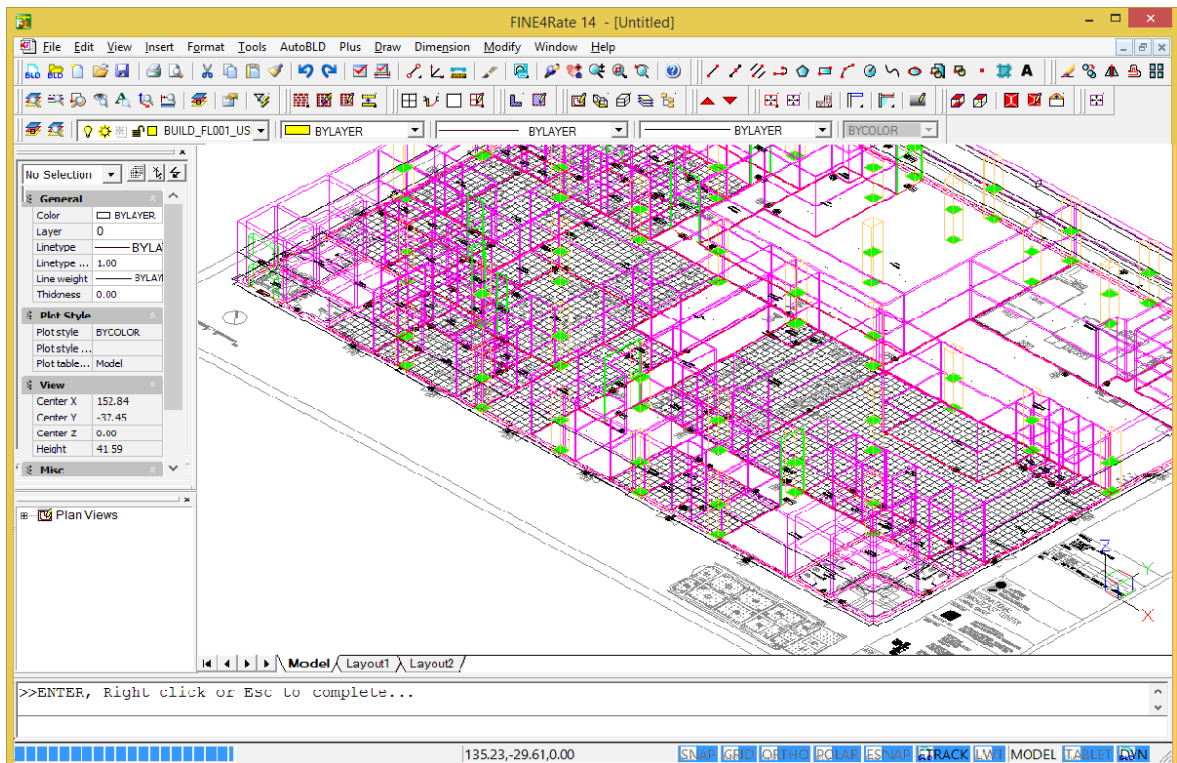
- Plan View (2D): The two-dimensional plan view of the respective building level is shown.



- 3D View: A three-dimensional supervision of the ground plan of the current floor (with given viewing angles) is shown.

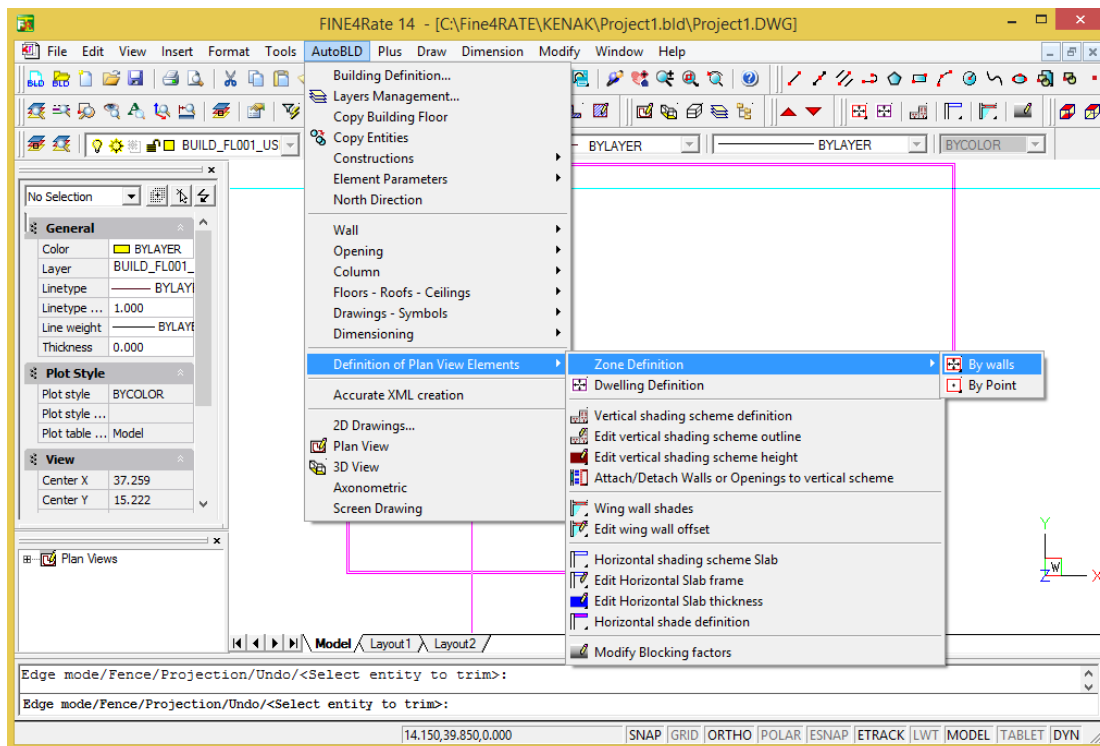


- Axonometric: Provides three-dimensional supervision of the whole building (for all floors), with the given viewing angles as they have been selected in "Viewing Features".



## 2.4.9 Definition of Plan View Elements

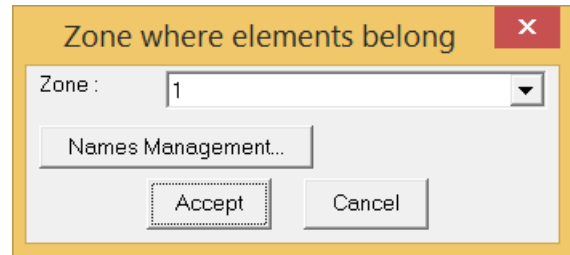
The FINE4Rate building model includes intelligent information, capable to recognize Zones and Dwellings.



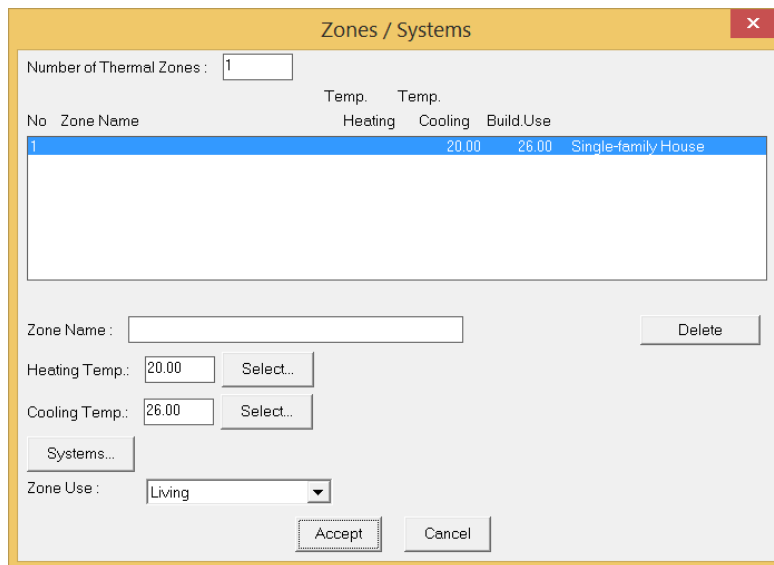
More specifically, as far as a “Zone” is considered, the “zone definition” command enables the user to define one or more zones, in two alternative ways:

a) by selecting the walls that surround each zone, or

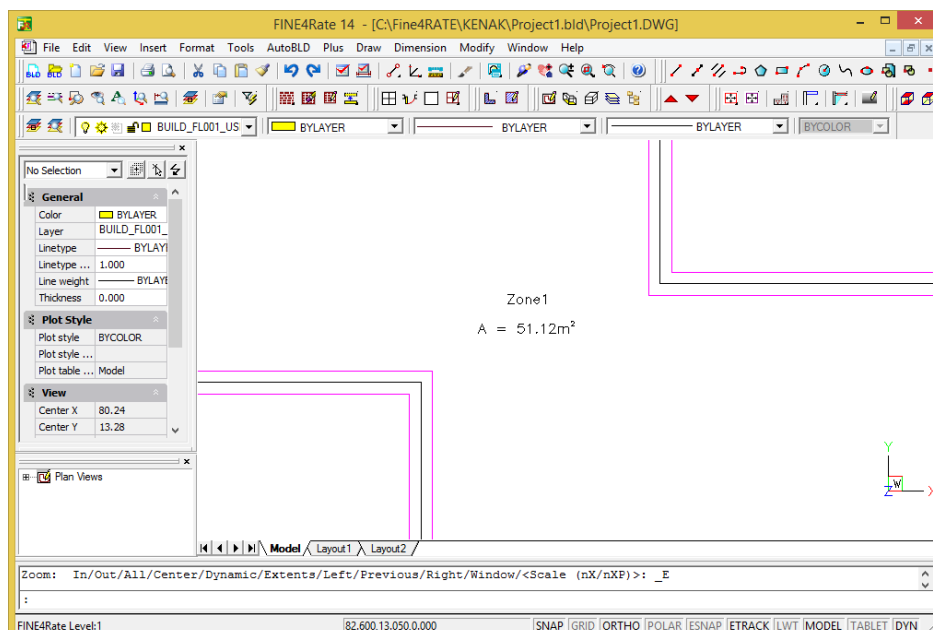
b) by defining an internal and an external point of the zone. This way needs only the definition of an internal point of the zone (by a left click of the mouse) and an external point so that the line-rubber that is formed intersects a zone wall. Then the program "indicates" (by discontinuous outline) the defined zone and asks for the zone name in the command line.



By entering the name, the zone definition is completed and its features are indicated on the drawing. Given that one or more zones are already defined,



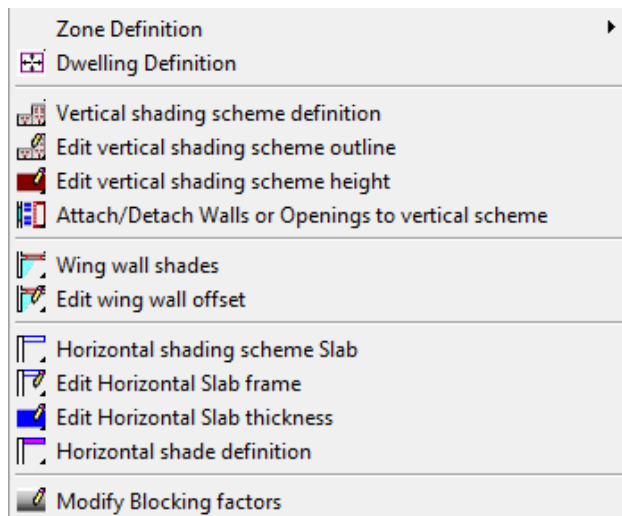
As soon as the zone is defined, its name and surface (in m2) is shown at the centre of the zone.



Regarding Dwellings, they can be defined only through Walls.

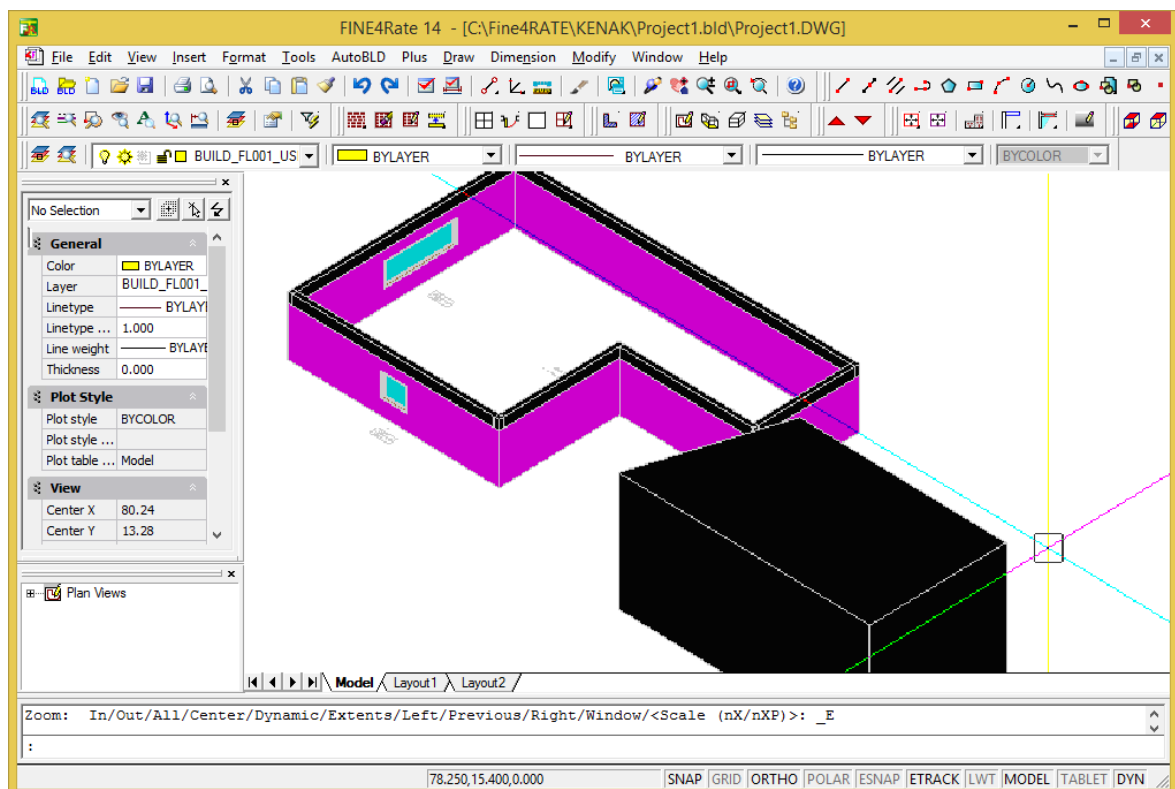
## 2.4.10 Shades

FINE4Rate provides the user with special tools to figure out the shades, due to various causes (neighbour buildings, horizontal and vertical cantilevers/slabs etc).



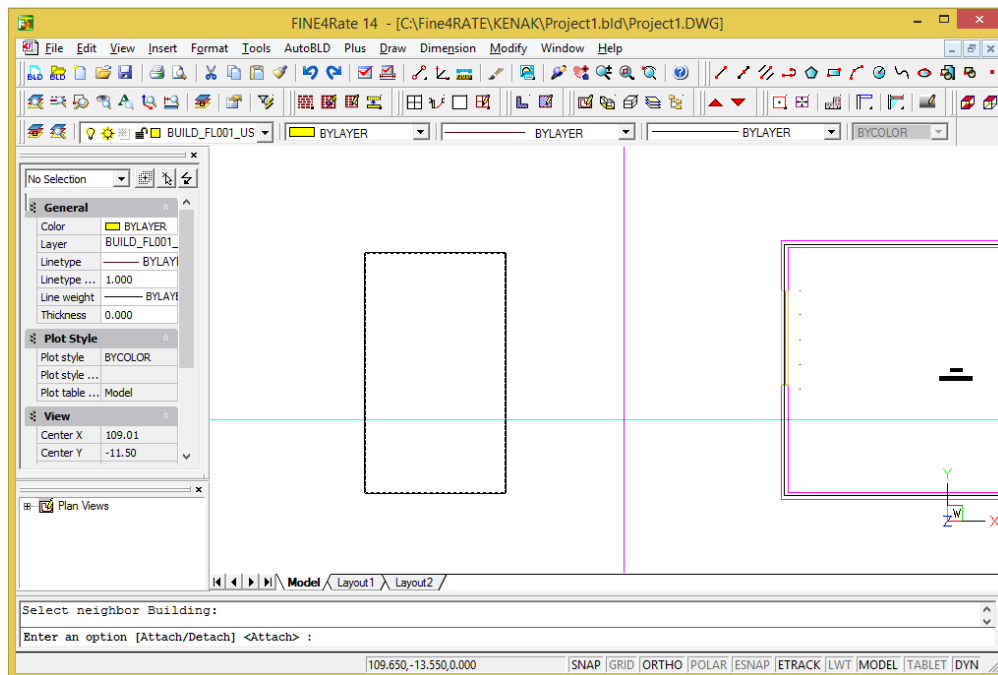
For instance, a neighbour building can be defined easily through a few simple steps:

The program asks the user to click on the polyline which corresponds to the ground plan outline of the building, or alternatively to click successively on the points of this outline. Whatever is the case, the program asks then for the building elevation (ground level) and thereafter for the building height and blocking factor. As a result, the neighbour building appears on the screen in 2D and 3D.

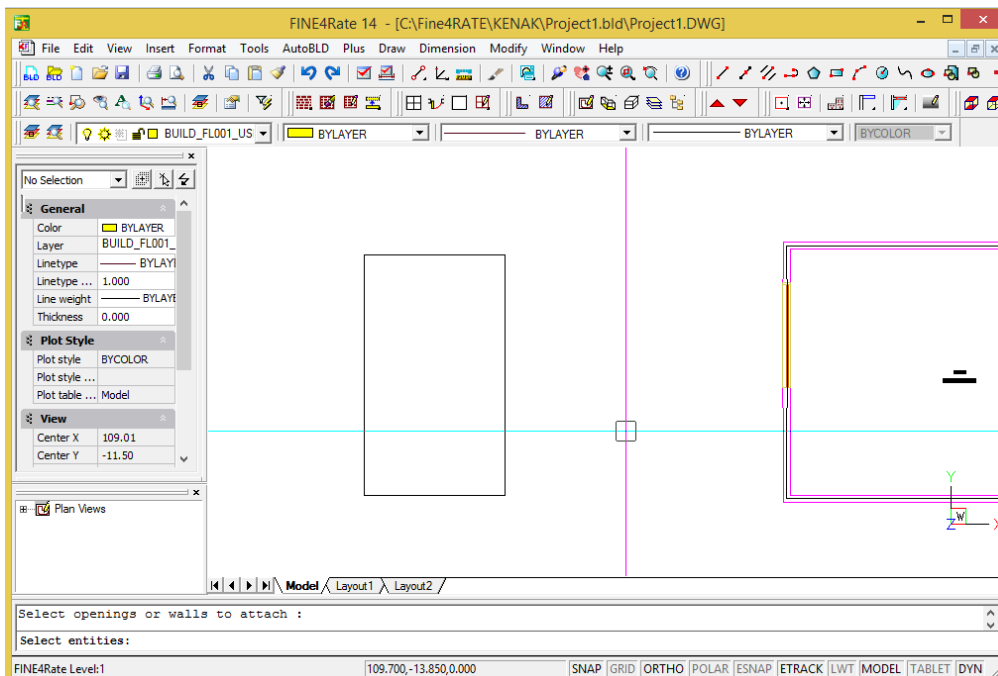


The building outline as well as the values for the building height are always editable through the respective commands.

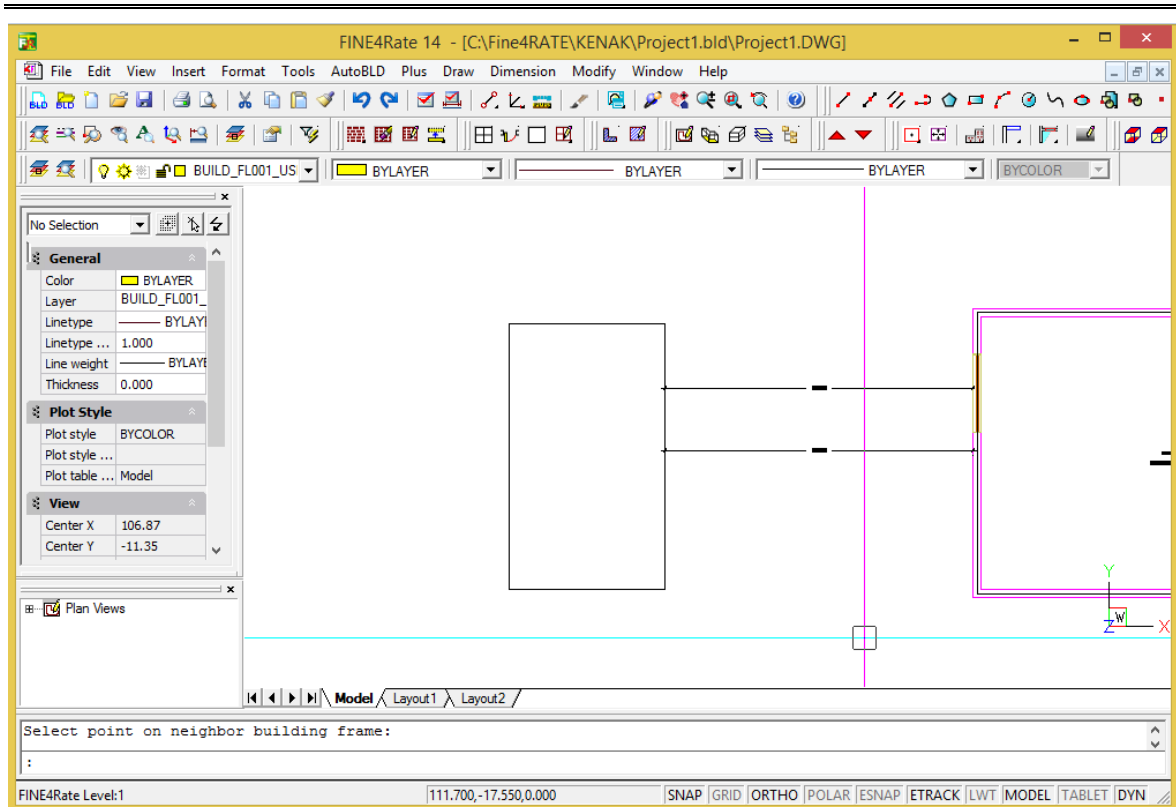
After the neighbour building definition, the building walls and openings have to be attached to the neighbour building through the command “Attach/Detach”.



This command asks first the user to “Select the Neighbour Building” and just after the expected click, the user is asked to select between Attach or Detach.



If the command “Attach” is the case, then the program asks the user to show the adjacent entity to be attached with (i.e. wall) and after the selection, the user has to press <Enter> and thereafter to “Select a point on the neighbour building frame” for the attachment info to be visible though a line (lines) along with its distance(s).



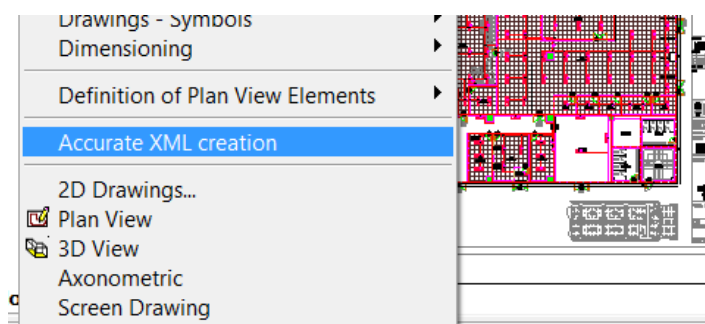
While executing the Attach command, the user can keep selecting more than one objects (i.e. separately the wall and windows) the program showing at the same time the number of “entities in set”.

The Detach command is quite similar, the user has to select the entities and then to press enter. As a result, the attachment lines disappear.

The same concept is being used for the other commands as well, regarding the horizontal and vertical cantilevers and/or slabs: the program asks the user to click on the respective polyline or alternatively on the successive points and thereafter the program asks for the elevation and thickness values as well as the blocking factor in order to create the object through which the shade will be finally calculated.

## 2.4.11 Creation of the Accurate XML file

Once the user has defined properly all the zones, he/she can apply the command “AccuRate XML Creation” in order to create the XML file which constitutes the input file to AccuRate program. Given that all the necessary building elements have been defined in the 3D model along with all the additional necessary



info (zones, vertical shades, horizontal shades etc), therefore as a result, all this info can be exported to the AccuRate Sustainability project file.

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## 3. Example

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In this chapter an example is presented, which will help you understand in practice the basics of drawing in FINE4Rate. This simple example aim mainly at helping you start drawing building entities (walls, openings etc) and defining the necessary elements so all data is populated to the Accurate Sustainability software.

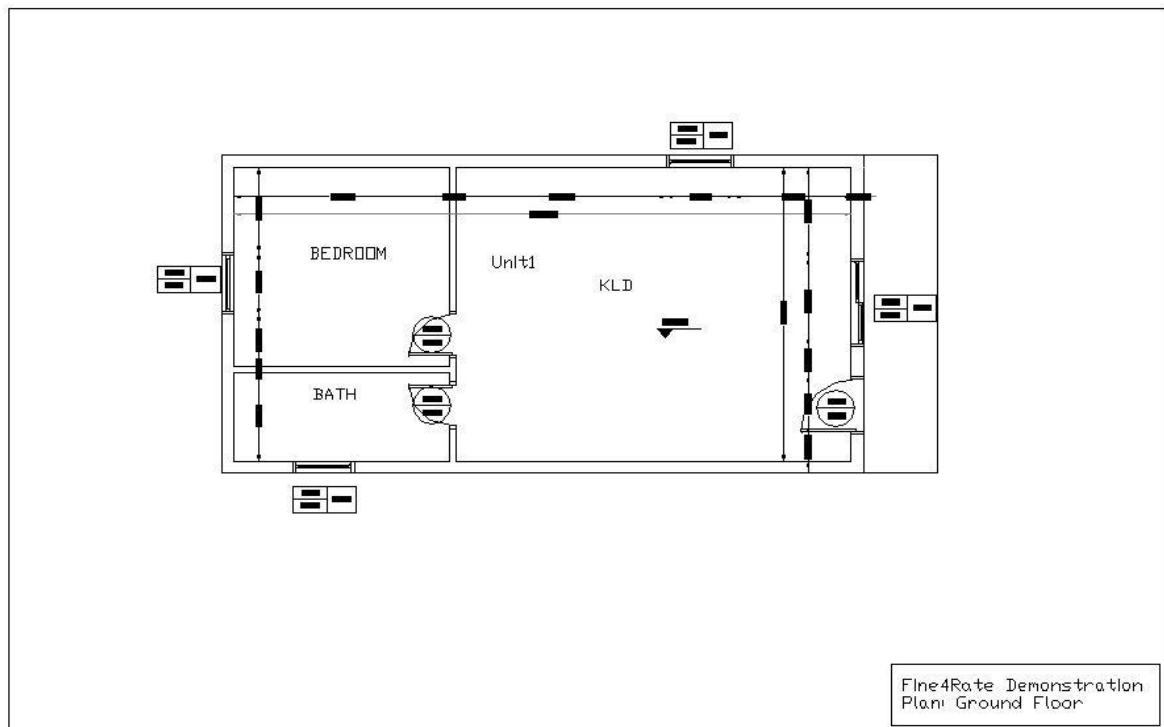
Apart from the following example, you can watch the same steps (and much more) in the videos you will find in <https://www.youtube.com/channel/UCcUvAionkYxaC9TZFP2C4Fg>

**Very important:** We draw in meters (with three decimal places to be compatible in view with most plans that show lengths in mm), so if plans are in mm we have to scale every each one by 0.001

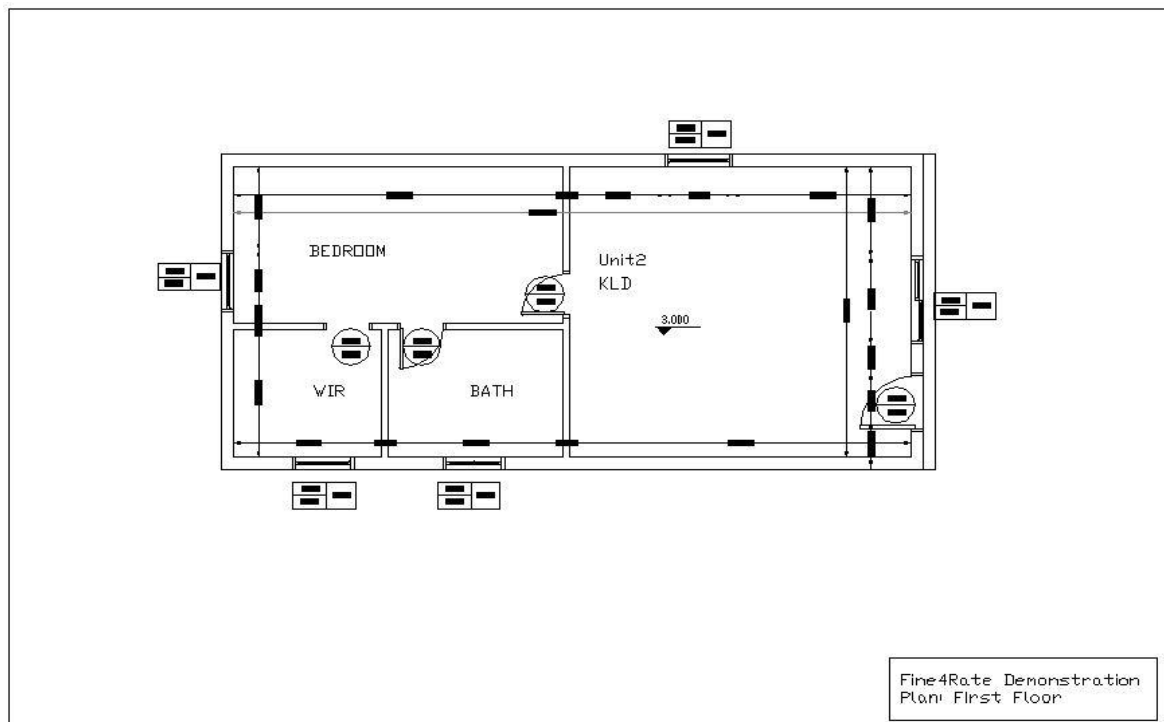
We will explore two different options, the existence of an IFC file, that is the 3D model of the building which every updated architectural software has the capability to produce, and the option of having simple plan drawings files in dwg or dxf format. There is also the option of having pdf files but this is not recommended since there are really not easy to work with in a drafting environment.

Let us assume for example that we have a 2-storey building with separate dwellings in each floor. The plans of each floor are given in the following images

Ground Floor

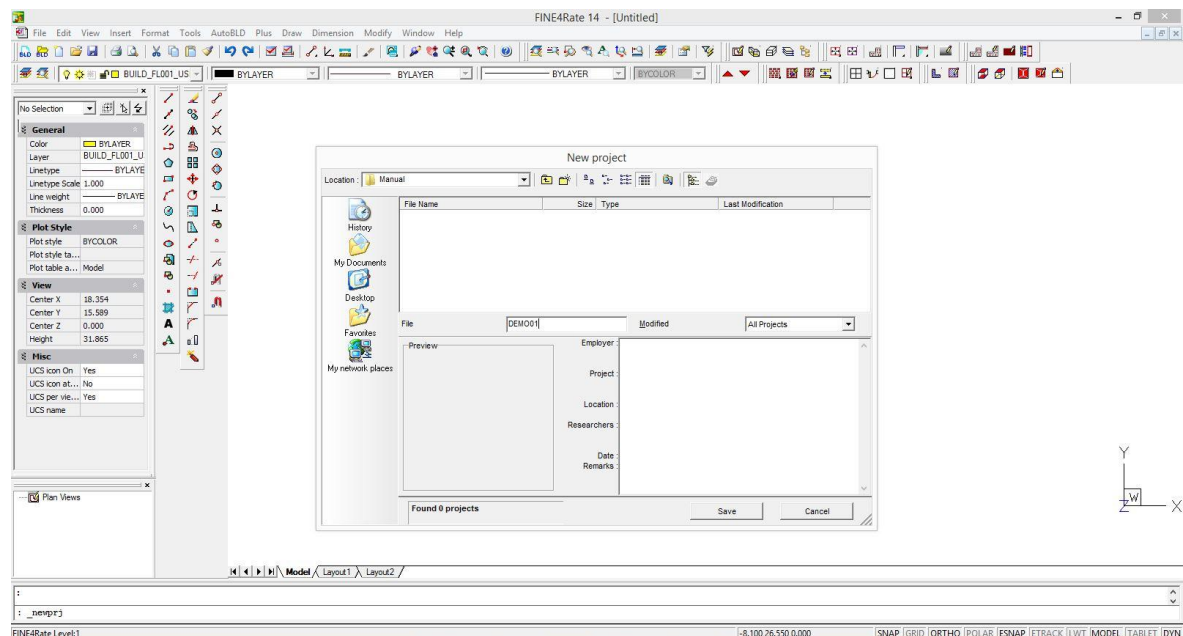


## First Floor



## 3.1 Building definition

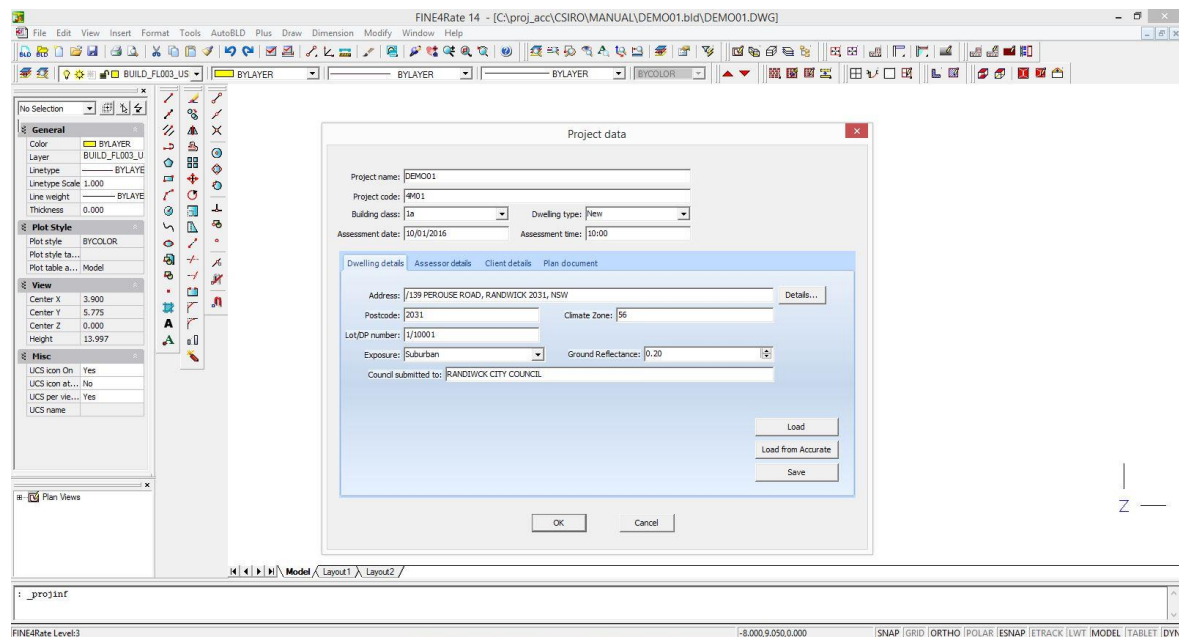
In all cases the first step is to define a new project



We select our main projects folder and then we assign in the dialogue box the name for our project, say DEMO01. The software then creates inside the main projects folder a new folder named DEMO01.BLD which will be our project folder and inside this folder it also creates the file DEMO01.dwg our working project dwg file.

Then we provide all project information such as Project name, Project code, Building class, Dwelling address, Assessor details, client details Plan Document details

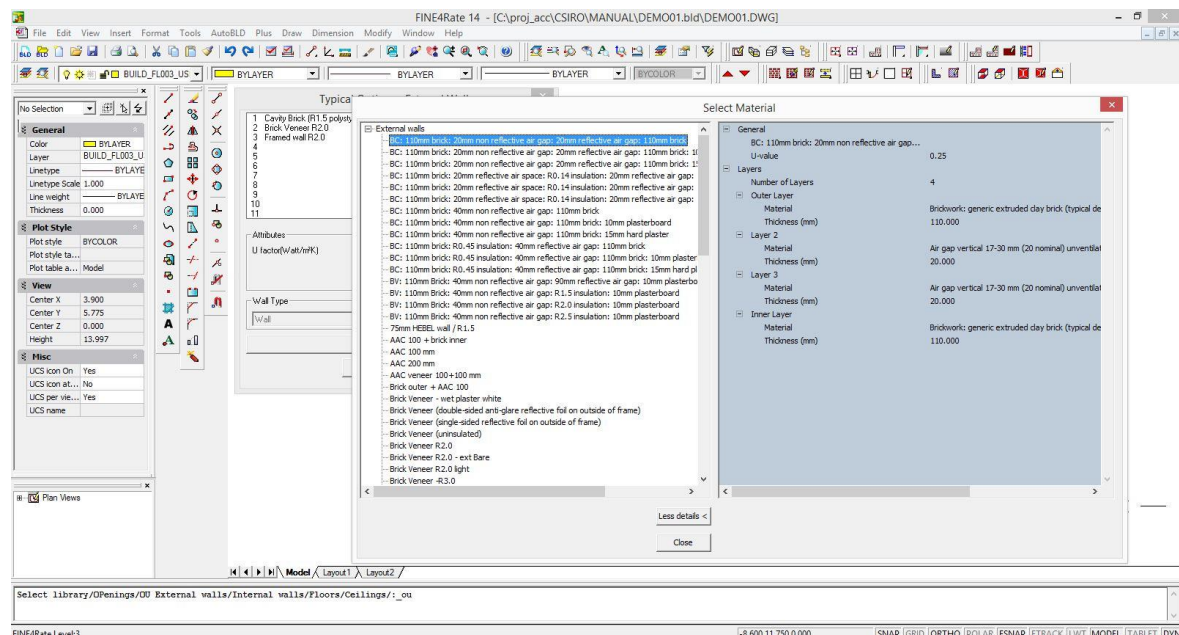
All the information will be exported and populate the same fields in the respective AccuRate Sustainability file



Then we have to select the constructions for all building elements, that is External Walls, Internal Walls, Floors/Ceilings, Roofs, Windows etc

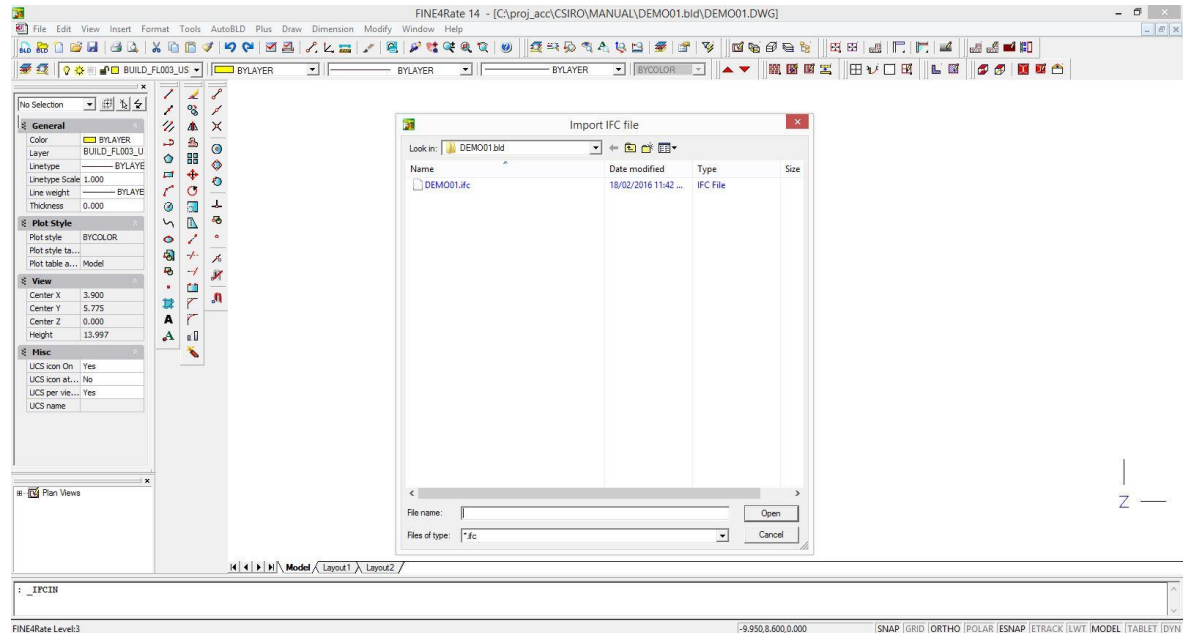
We use the AutoBLD – Constructions menu

There are already selected constructions for every element but of course we can also select other constructions from the AccuRate database



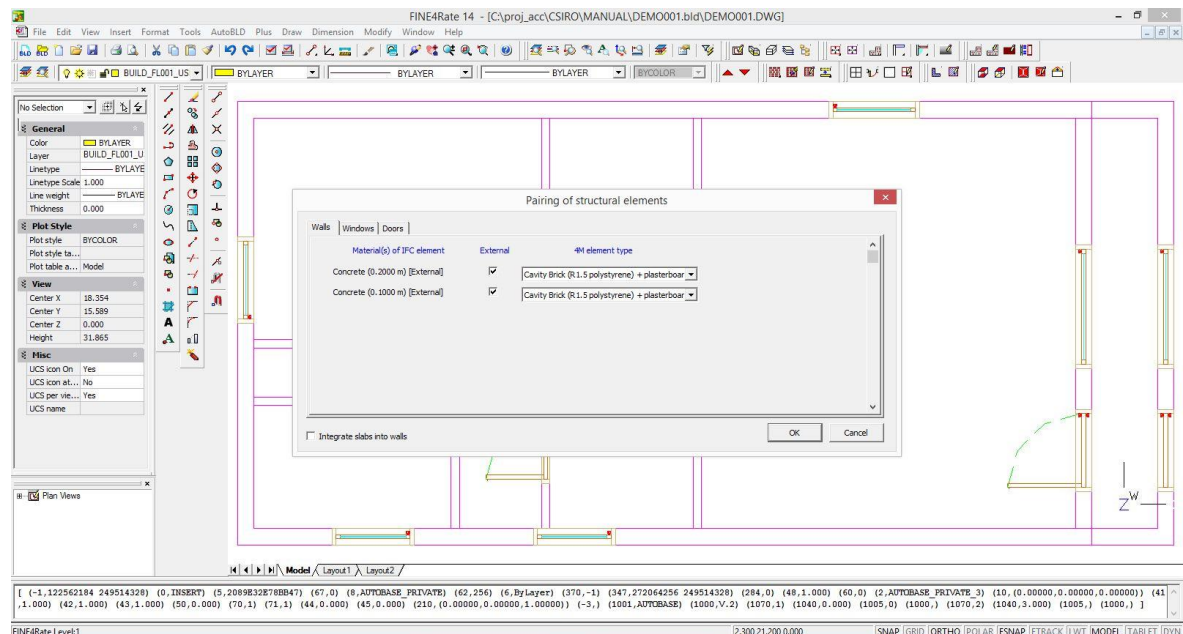
### 3.1.1 IFC importing

After defining and creating our project file and having selected our Constructions database we use the IFC import command to import the 3D model of the building. We select the ifc file and click open

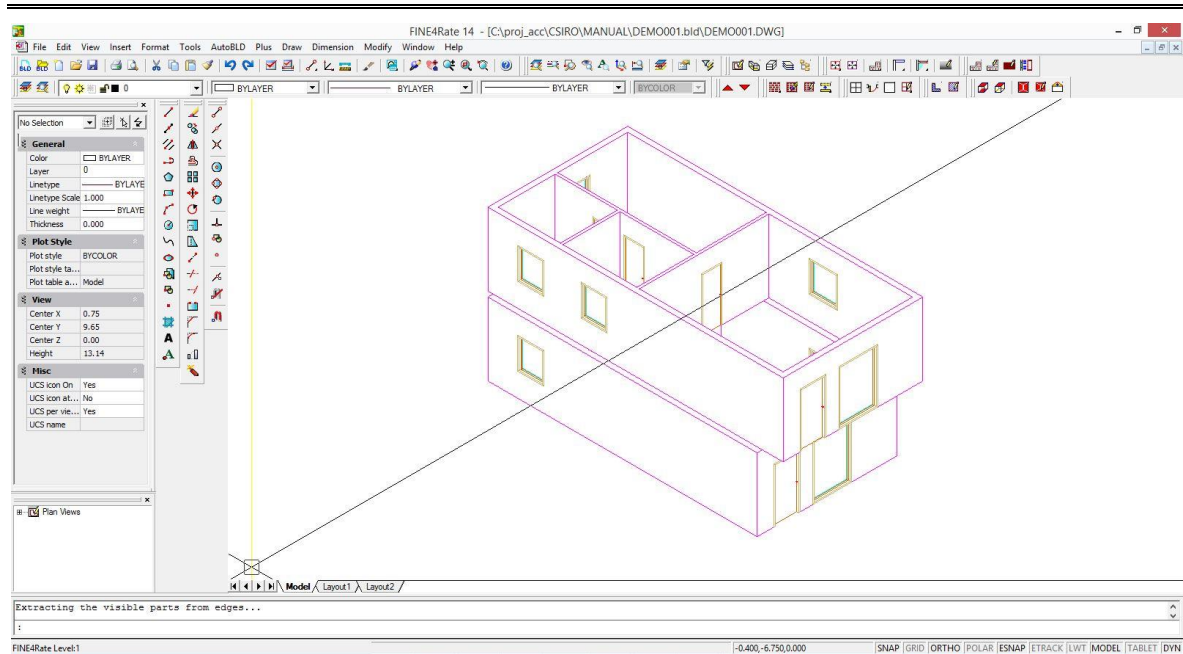


We click to select the Building elements option, then OK

After importing the 3D model we are prompted to Pair all structural elements with our Constructions database



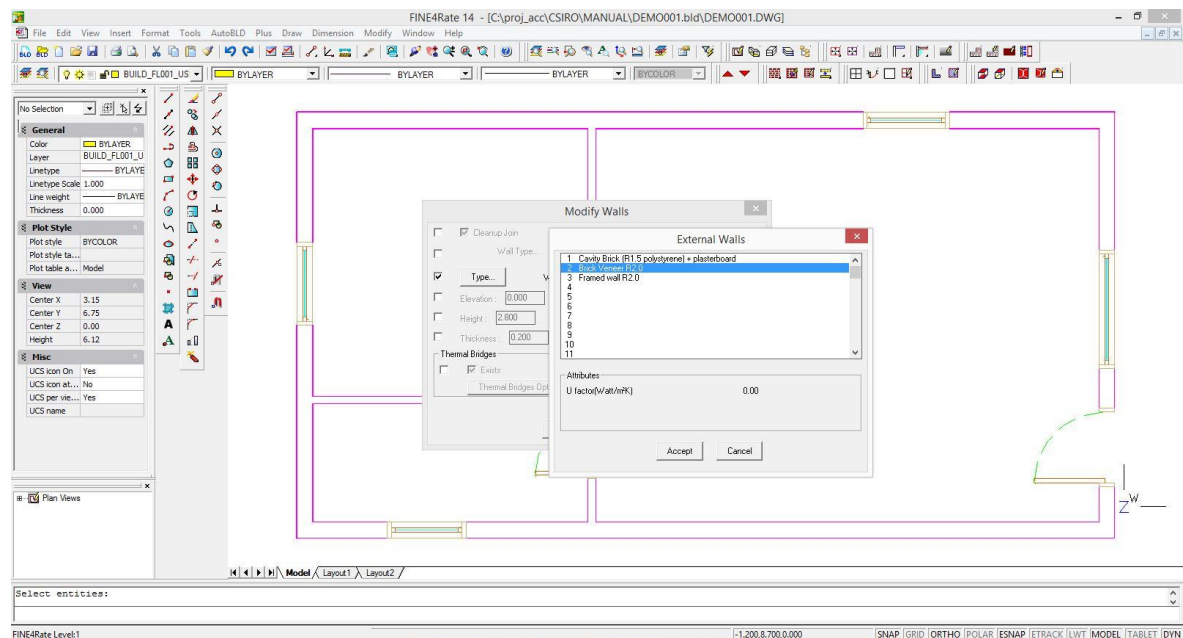
Having done that we get the whole building with all its building elements been assigned with the selected Constructions



Of course if we need to change the construction of a single or multiple elements we can do so, for example we like to change the wall construction of all first floor walls.

We click the Plan View icon, click the One Level Up or One Level down icon to select the working level, use the AutoBLD-Wall-Multiple Modification pull down menu command, select all external Walls, click enter and the Modify Walls dialogue box appears.

We select Type, choose the preferred Construction and click accept and accept. All selected walls are now of the Brick Veneer R2.0 Construction type



Same applies to internal Walls

### 3.1.2 DWG or DXF plan files

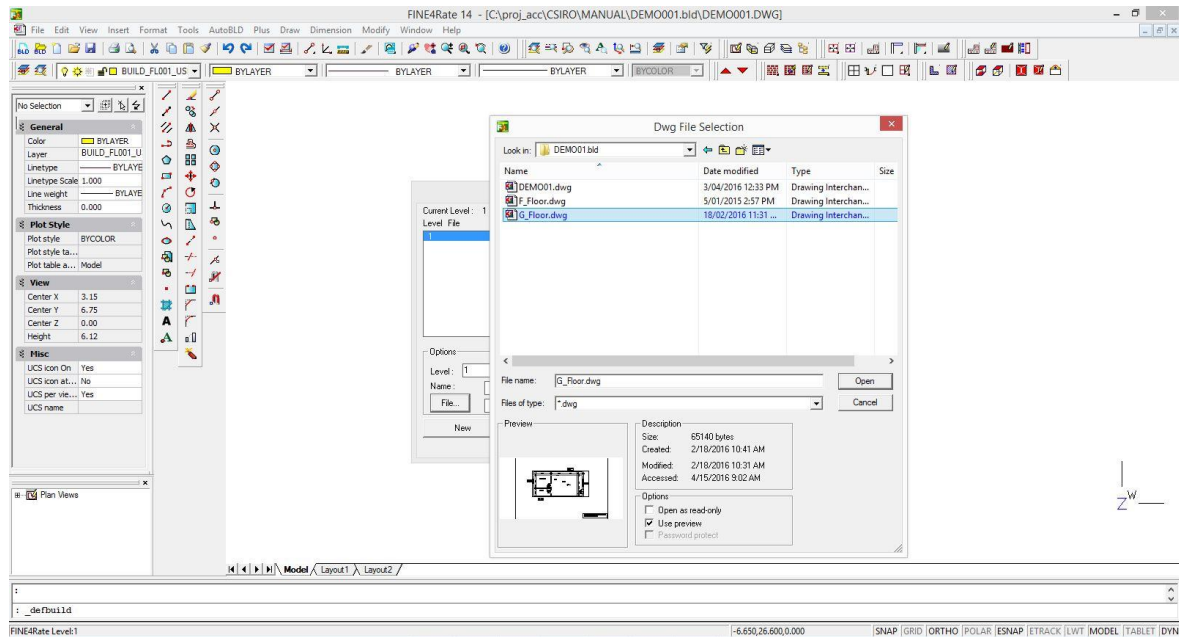
In the case that we are provided with dxf files we simply open them and save them as dwg

After defining and creating our project file and having selected our Constructions database next step is to define the Building Levels and assign the appropriate dwg file

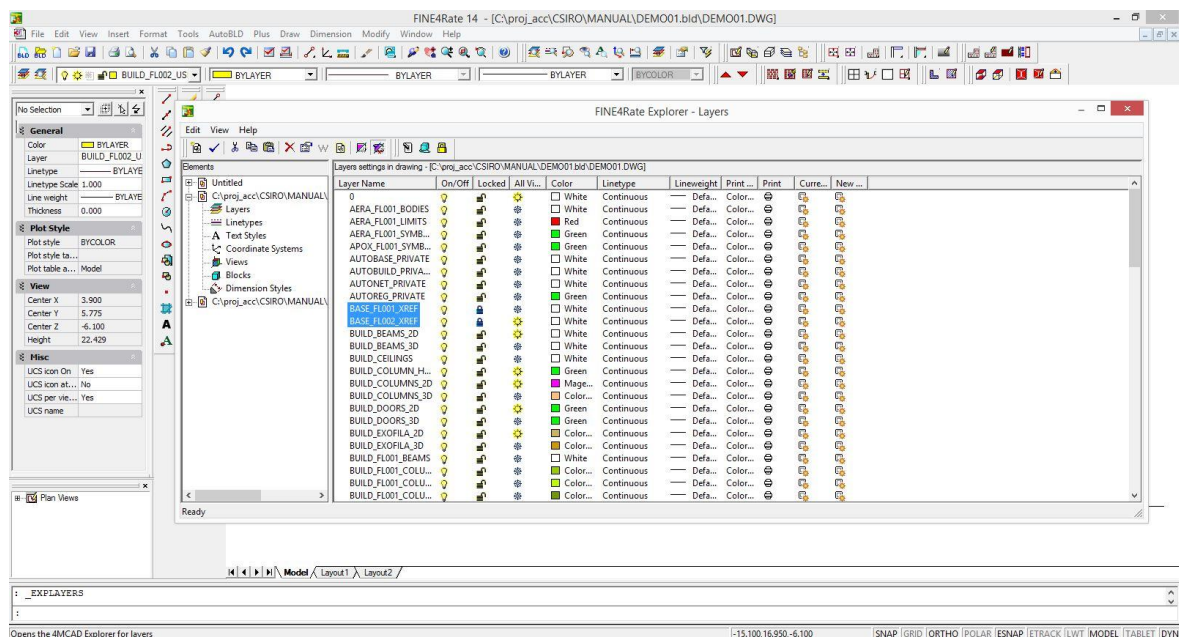
We use the *AutoBLD – Building definition* pull down menu command

Then for each level we have to provide

The Level number, its elevation (in meters), a name (not required), select the appropriate dwg file by clicking *File* and choosing it and *New*



Then we lock the xref (plan dwg) layers by using the Layers Explorer so that we don't accidentally erase or move them. These layers have the name BASE\_FL001\_XREF, BASE\_FL002\_XREF etc

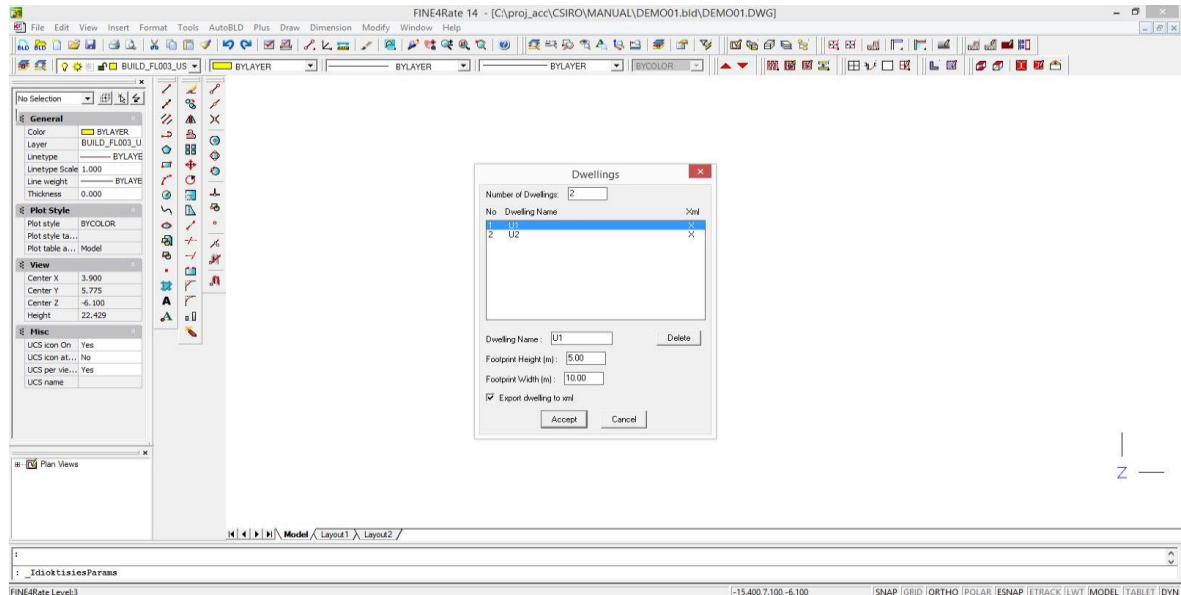


In the case of dwg plans we have to actually draw all necessary building elements, these are External Walls, Internal Walls, Windows and Doors, Roofs if they are inclined and of course assign to each one of them the appropriate Construction (chapters 2.4.4 to 2.4.7)

## 3.2 Dwellings and Zones definition

This Building has 2 Dwellings and a total of 7 Zones

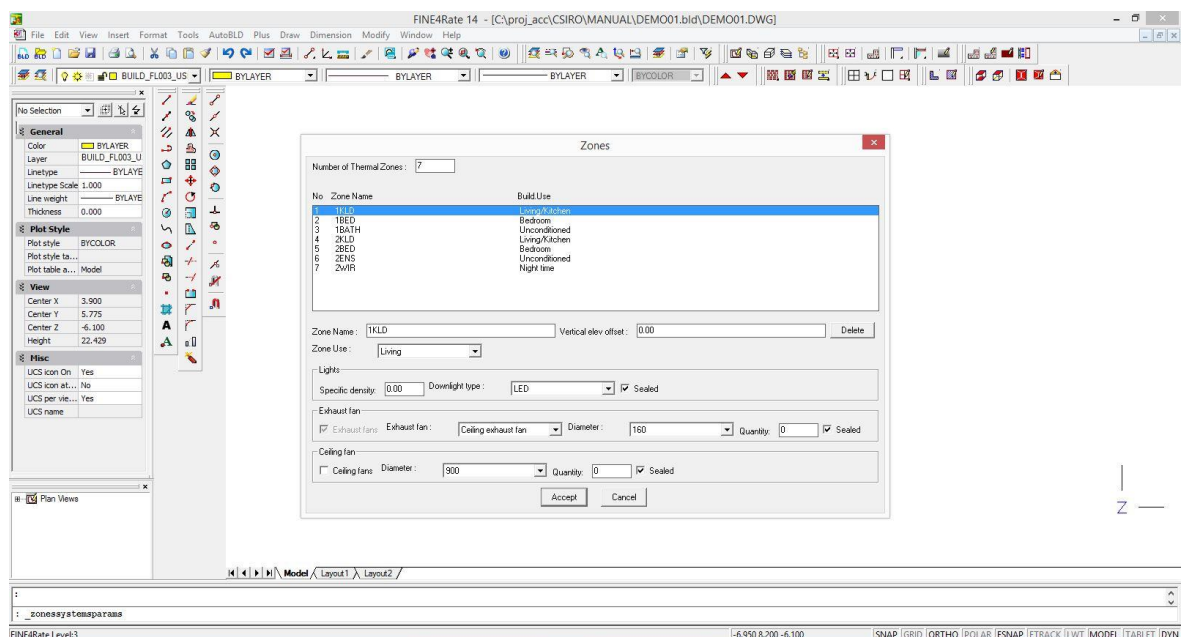
Dwellings definition: *AutoBLD – Element Parameters – Dwellings...* pull down menu



In this dialogue box we fill the vertical and horizontal maximum internal dimensions that give the footprint of each dwelling, this info will fill the appropriate fields in the ventilation dialogue box in AccuRate Sustainability. We also select whether to export the dwelling to an xml file or not.

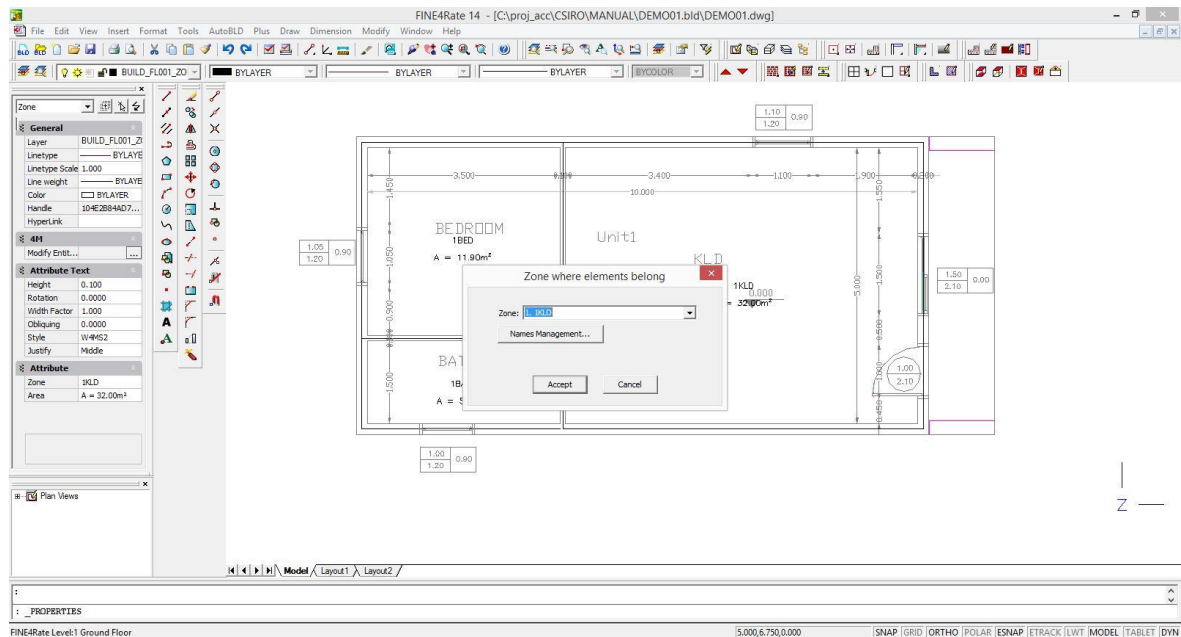
Zones definition: *AutoBLD – Element Parameters – Zones...* pull down menu

Define number of Zones, and then for each Zone the Name, Type, Penetrations and Vertical offset (in case of a zone being in an elevated height on the same level)



Assign zones for each space

Using the *Zone Definition by point* icon or the menu command *AutoBLD-Definition of Plan View Elements-Define Zone by point*, we click inside the zone and click towards a wall, the zone selection dialog box appears and we select the Zone



### 3.3 Floors - Ceilings - Roofs

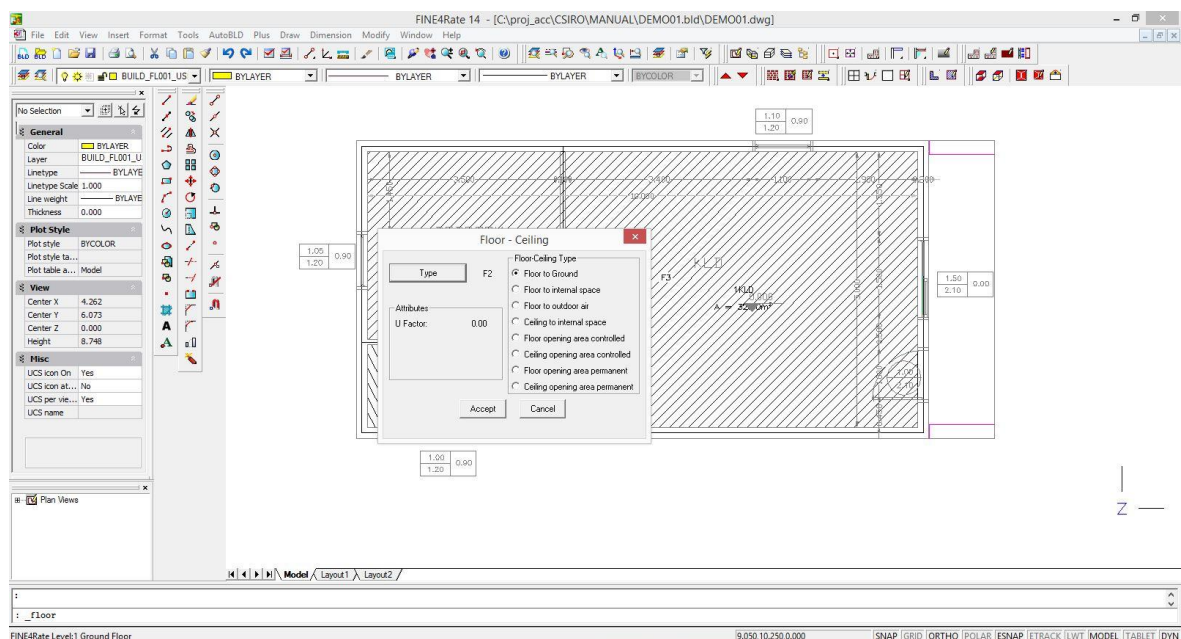
Using the Floor – Ceiling icon we define floors and ceilings as well as opening areas in floors or ceilings

We don't need to follow the zones, we define the areas that each element occupies

For the ground floor for example we have two different Floor Constructions:

F2 to ground: Concrete Slab 200mm: ceramic tiles/bare for BATH and

F3 to ground: Concrete Slab 200mm: carpet/bare for KLD and BED

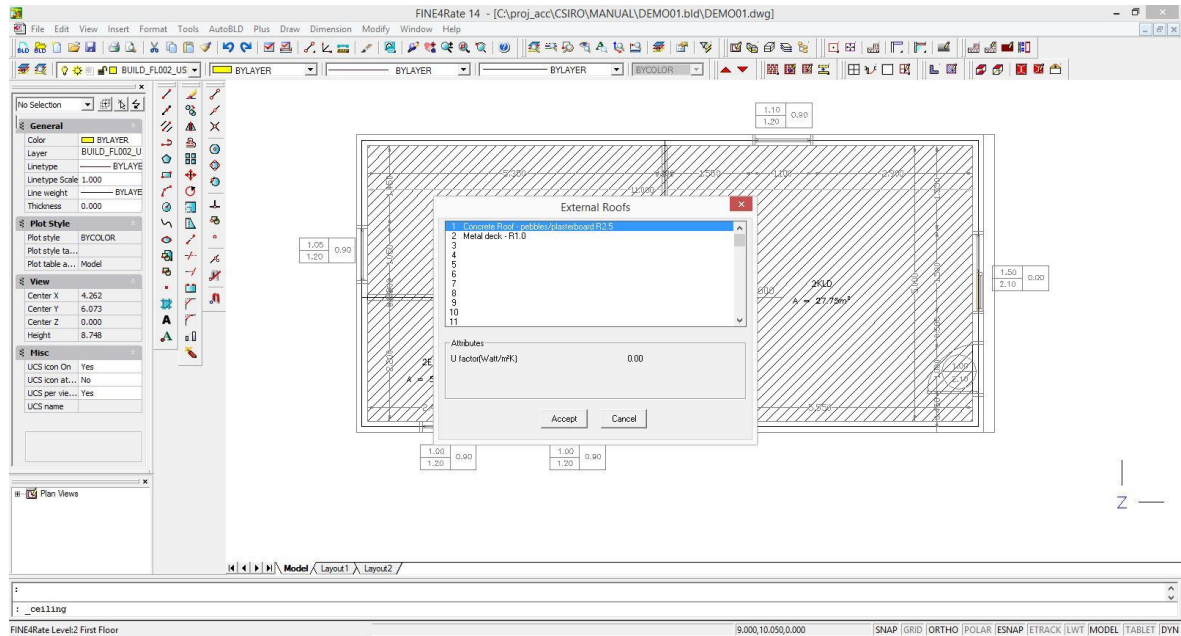


Same applies to First Floor and Ceilings

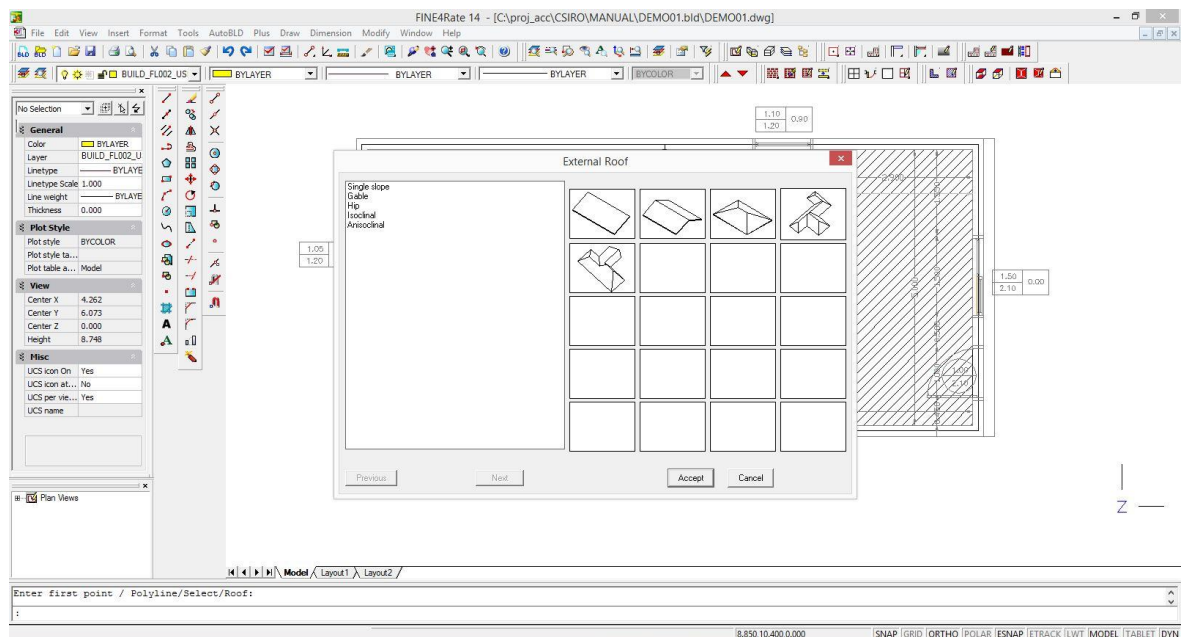
For flat Roofs also

In our example we define the Roof construction on the second Level (First Floor)

R1: Concrete Roof – pebbles/plasterboard R2.5



In case there is an inclined Roof, then we have to define it by using the Roof Placement icon. The software is capable of not only defining the single type Roofs found in AccuRate Sustainability software (single sided=Single slope, Double sided=Hip, Four sided=Gable) but also more complicated Roofs as isoclinal and anisoclinal. After defining their geometry we have also to assign a roof construction

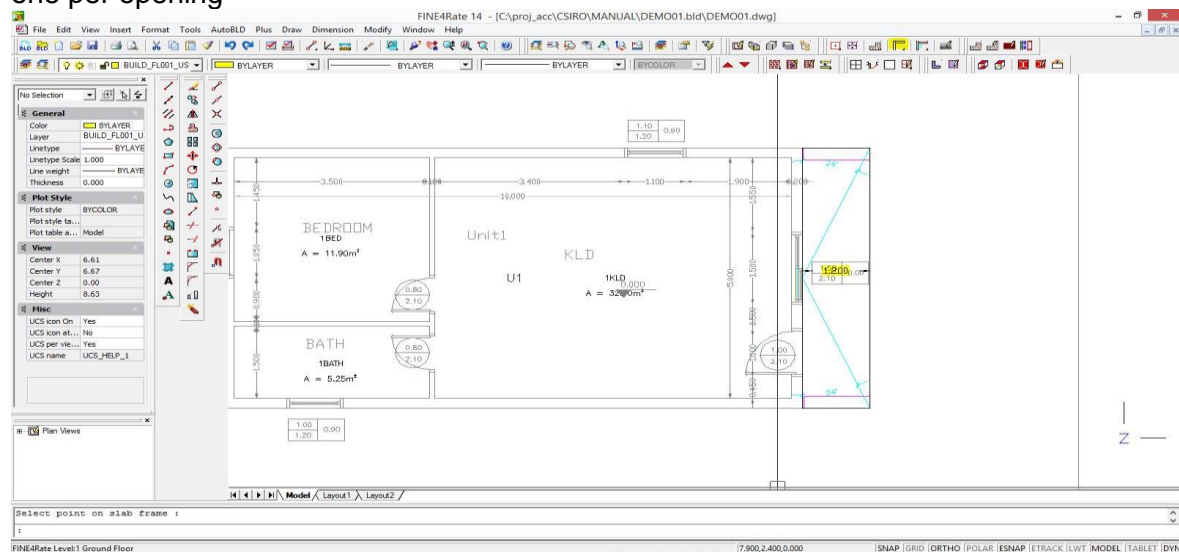


## 3.4 Shades

### 3.4.1 Horizontal Schemes

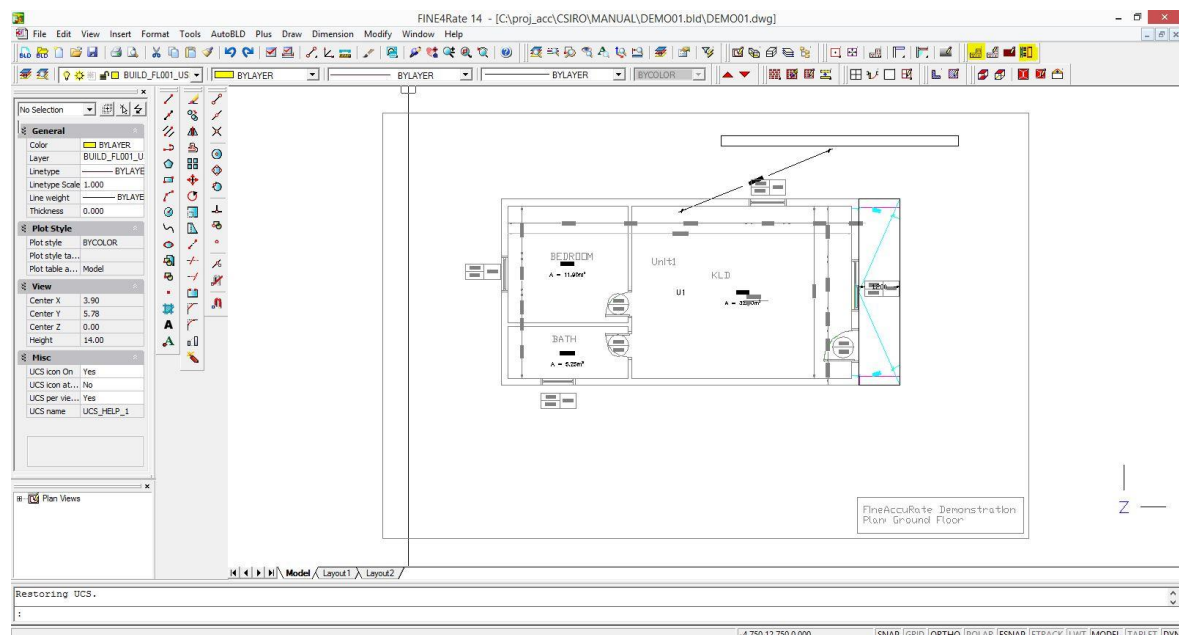
Using the Horizontal shading Scheme Slab icon we first define the slab by either drawing its perimeter or selecting a rectangle that defines it and input its characteristics that is elevation and blocking factor

To define the walls or openings that the scheme applies to we double-click to a point in the perimeter of the scheme, choose attach and then click to a point of the appropriate walls and openings. We are permitted to define only two Horizontal Schemes per wall, one per opening



### 3.4.2 Vertical schemes

Using the Vertical shading Scheme icon we first define the neighbour Building or Screen by either drawing its perimeter or selecting a rectangle that defines it and input its characteristics that is elevation, height and blocking factor

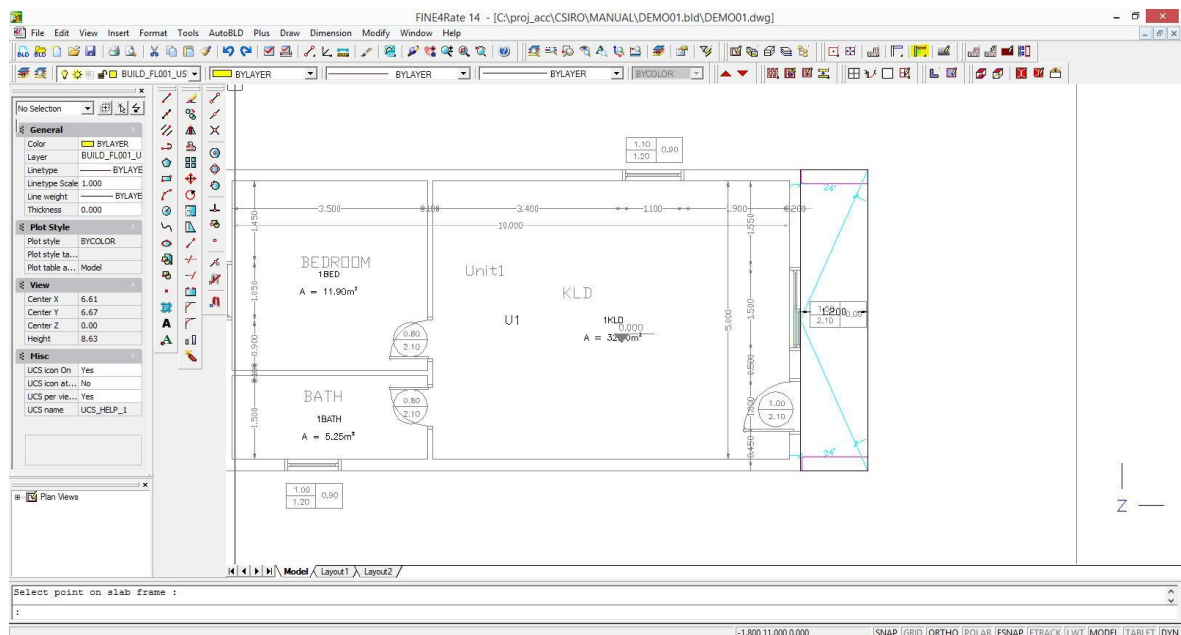


To define the walls that the scheme applies to, we double-click to a point in the perimeter of the scheme, choose attach and then click to a point on the appropriate walls. We are permitted to define only three Vertical schemes per wall.

We can also define as a vertical shading scheme a wall that shades another, that would also be the case of a balcony wall. We do so by using the furthest to the right icon, “Attach/Detach Walls or Openings to vertical scheme”, click at the vertical scheme wall, give its height at the prompt and then click the wall that it shades.

### 3.4.3 Wing Walls

Using the Wing Wall shade icon we first choose whether we like the shading area to be hatched or not, we define that by clicking in the Draw box and Accept, then by clicking to a point that defines the Wing Wall furthest point, input the vertical offset value and select the appropriate wall. We are permitted to define only one Wing Wall per side of a given wall



To define different blocking factors per month to a scheme we click the Blocking Factors Modify icon, then select by clicking the appropriate Horizontal or Vertical scheme and input the required values for each month

## 3.5 Creation of the Accurate XML files

We use the *AutoBLD - AccuRate XML creation* pull down menu command and the software creates the two XML files each for every dwelling which constitute the input files to the AccuRate Sustainability software.

