

Levels Explained

Purpose

This manual explains how the level properties *Elevation*, *Floor thickness*, and *Height* are related.

Introduction

When you start a new project in Sweet Home 3D you start with a single level with its properties set according to what you have set in your preferences. For this manual we will use the following settings in the preferences:

New wall height = 250

New levels floor thickness = 20

When you add a level this will be created with a height of 250 and an elevation that depends on the previous level.

It is important to understand that a level is the base environment for walls and rooms at a specific elevation and with a specific height. You can draw walls higher than the level height but the ceiling of a room will be at the level height.

You have to draw a room object to see a floor.

The start level

After you started a new project there are no tabs for the levels because there is only one level. You can right click in the 2Dview and select "Add level" . Now you have two tabs at the top of the 2Dview, one for each level. When you double-click on the first tab you get a dialog that displays the properties for that level:

Viewable

Name: Level 0

Elevation (cm): 0

Floor thickness (cm): 20

Height (cm): 250

Levels summary (the edited level is selected):

Name	Elevation	Floor thick...	Height
Level 1	270	20	250
Level 0	0	20	250

OK Cancel

As you can see the height is set at 250 and the floor thickness is grayed out. You can't change the floor thickness because there is no level below the current level to support a floor thickness. The floor has a height of 0.

Important to remember: a floor extends *downward* below the set elevation.

Going up

Name	Elevation	Floor thick...	Height
Level 1	270	20	250
Level 0	0		250

You already added a level (Level 1) in the previous paragraph. Double-click the tab with “Level 1” and you get a dialog with the properties for Level 1:

The height is set to 250 because we have the *New wall height* in the preferences set to 250. The floor thickness is set to 20 because we have *New levels floor thickness* in the preferences set to 20. But why is the elevation set to 270? A little reminder:

Important to remember: a floor extends *downward* below the set elevation.

What happens is that the new level has a floor thickness of 20 that extends downward. You don't want that new floor to occupy space in your Level 0 so to elevation is set to 270: 250+20. That way the first level remains 250 high as it was created and the new level has a floor 20 thick and a height of 250.

This results in a simple formula for levels going up:

Elevation previous level + height previous level + new floor thickness = new elevation
 $0 + 250 + 20 = 270$.

If you want the new level to have a thicker floor, for example 50 (= +30) your new elevation becomes 300: $0 + 250 + 50 = 300$.

The current level determines where you start calculating for a new level: its elevation and height. Add the new floor thickness and you have your new level elevation.

Going down

Sweet home 3D allows you to add levels with a negative elevation for basements, swimming pools, below ground garages, etc.

To calculate the properties for below ground levels you need to know the floor thickness of the level above it. A little reminder:

Important to remember: a floor extends *downward* below the set elevation.

This means that when you want to add a level where it nicely touches the above level you will have to count down from the bottom of the floor of the above level. In our example the ground level has Elevation 0, Height 250, and no floor thickness.

Right click in the 2Dview and choose "Add level". Double-click the new tab and set the negative value -270 for the elevation. Why -270? Because now the ground level has room for its floor to extend downward. If you double-click the tab for Level 0 you will see that the property for Floor thickness now is available and has the value 20 as taken from the preferences. This means that there is already 20cm occupied in the space below 0.

To have your basement height still be 250 you have to count down from -20 which leads to the elevation of -270.

The floor thickness of the new level has no influence on the elevation because... you remembered? **Floors extend downward**. If there is nothing below it will be 0 and if you create another level further below it will initially start at the set preference of 20. For levels going even further down the same rules apply.

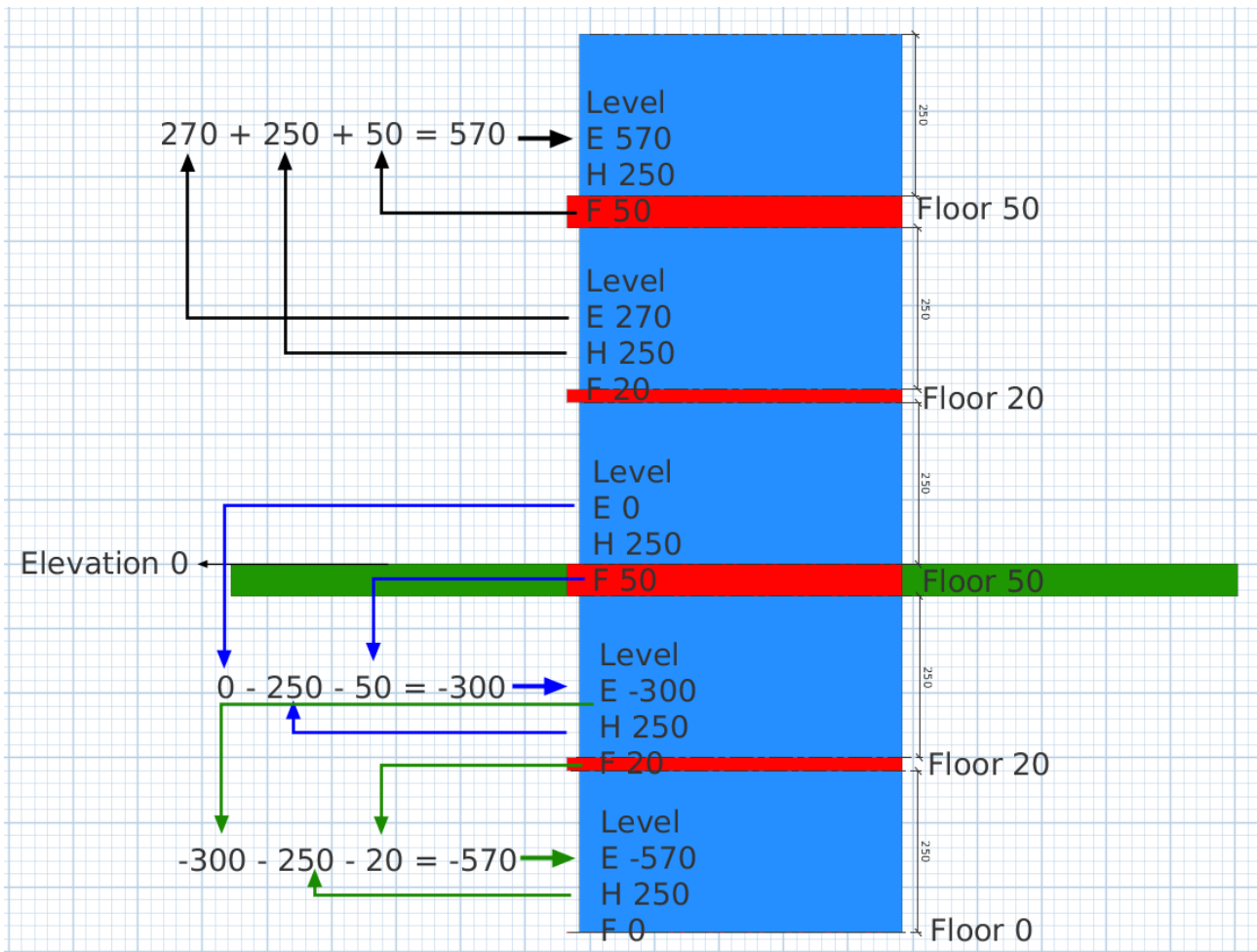
This leads to the following formula:

Elevation level above - floor thickness level above - new level height = new elevation
 $0 - 20 - 250 = -270$.

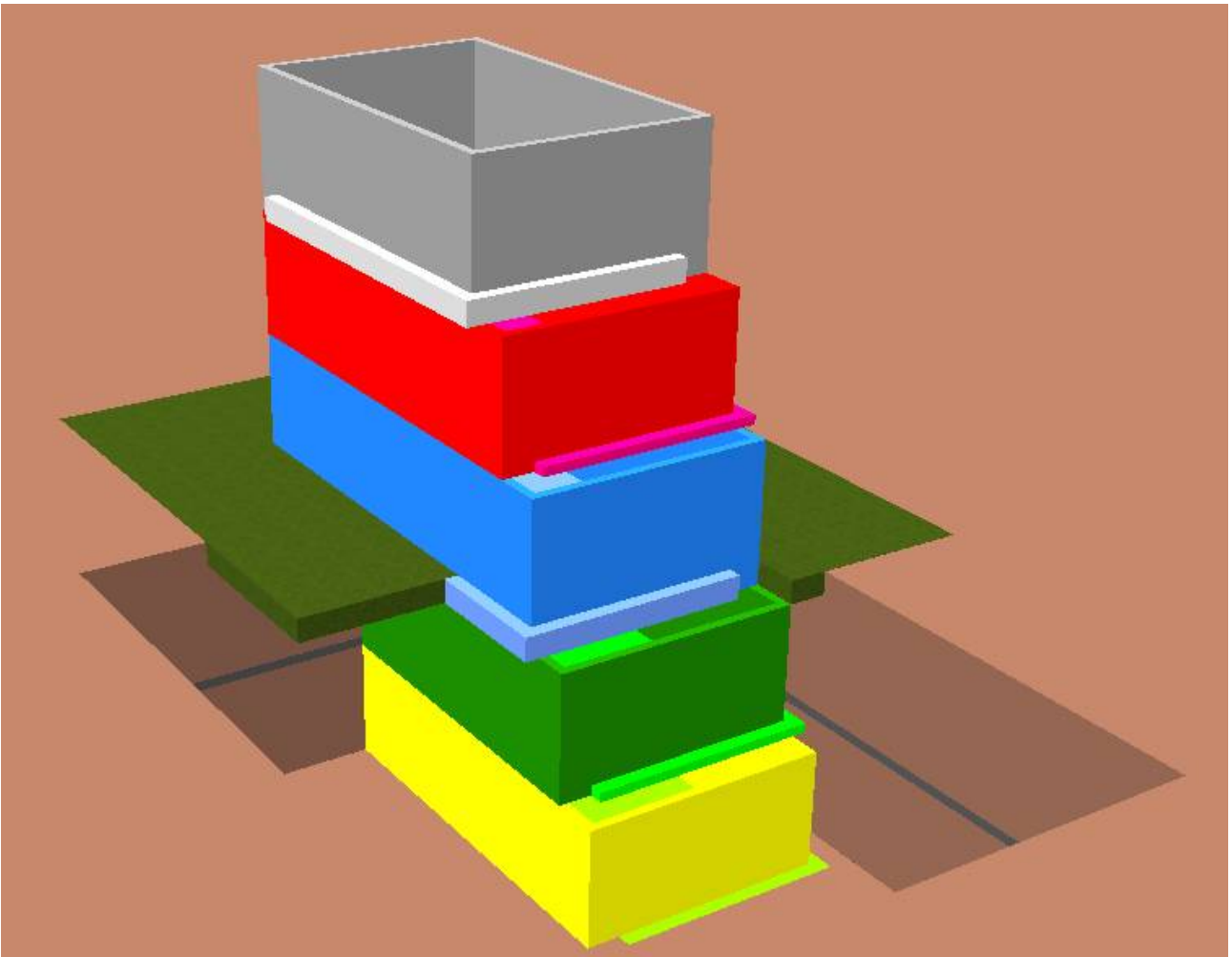
A level below that:

$-270 - 20 - 250 = -540$.

Levels visualized



In the above image you can see how the different properties are related with two levels above ground and two below. Two different floor thicknesses are used to display their influence on the elevation of other levels.



This is a 3D representation of the previous image. The rooms are moved a little outside the walls to show where they are. The grass floor is the ground floor outside and you can see that its height “sinks” downward. Another thing you need to notice and what has not been mentioned before is that the walls also extend downward to reach the bottom of the floor. The floor of the lowest level has no thickness because it has nowhere to go until a lower level is added.

What this means is that your wall of 250 high is actually $250 +$ the floor thickness high. You will not notice that when you decorate your room because the top of the floor to the top of the wall is still 250. That the walls also extend downwards ensures that the outside of your building has walls that touch top to bottom as if its a single wall.

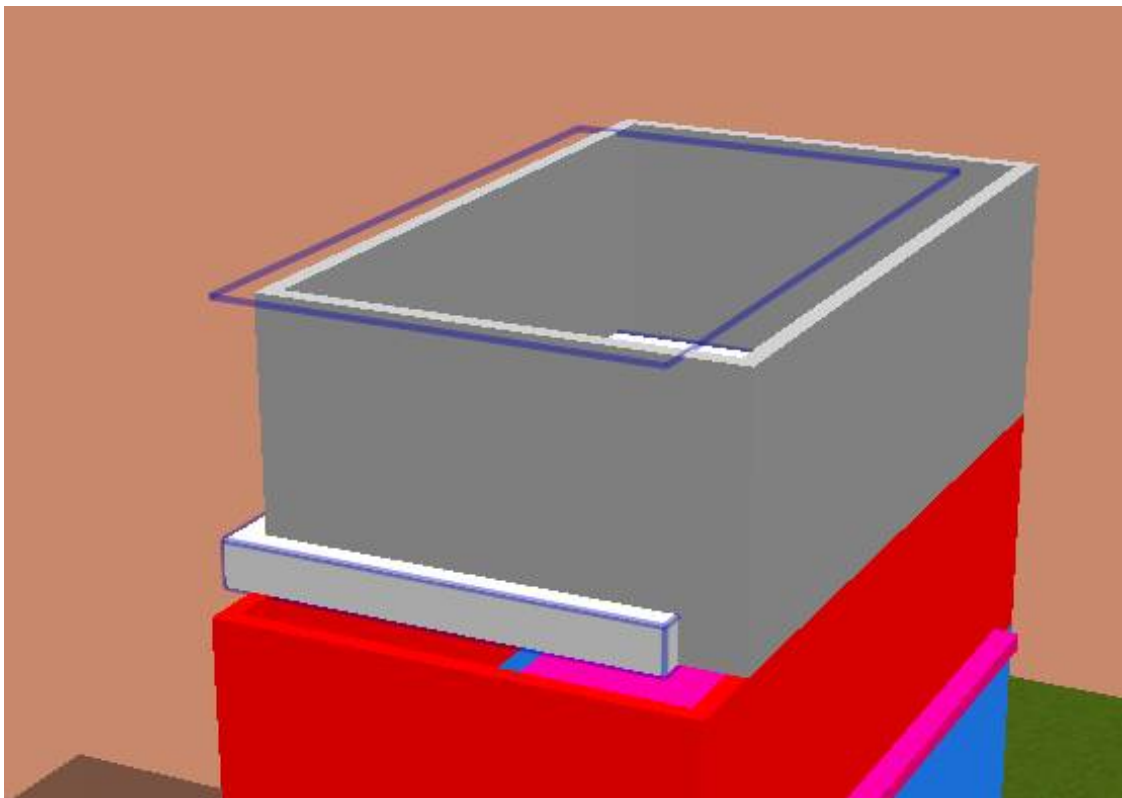
(The hole around the levels is created by walls 0.1 high as a perimeter around the other walls. Without it you wouldn't see the below ground levels because the surrounding ground would enclose them.)

Ceilings

When you draw a room you not only draw a floor but the floor object also includes a ceiling. In the image below the room is selected and as you can see there is not only a blue line bordering the selected floor but also a blue lined square at the top which represents the ceiling. Where does that ceiling come from?

The ceiling is a property of the room object you draw inside walls. And this is important to remember:

The height of the ceiling is the height of the level.



In the previous examples the level height was set at 250 and this means that the bottom of the ceiling is at 250, equal with the top of the walls. With the stacked levels as displayed the ceiling is at the same elevation as the bottom of the floor above it (if there is a floor above). You can disable the ceiling by double-clicking the room and removing the check mark for the ceiling. You disable the ceiling for an outside pool or if you use the room to export as a furniture part.

Intermediate levels

With split level rooms you don't use a reference to the properties of another level, at least not as with stacked levels. You can use the properties of other levels if you want a level to be a specific height below or above another level. just remember: floors extend downwards, the ceiling is a the level height. If you want a room 100 below the current level you set its elevation at the current elevation - 100 – new floor thickness. For a level 100 higher: current elevation + 100 – new floor thickness.

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