Test Case 08 – Appressed Floor and Ceiling with Thickness

Test Description: In BIM model, floors and ceilings typically have more than 1" thickness. When those building elements are exported into gbXML model, inconsistent geometric interpretations are found in BIM software. This test case provides a standard approach to handle floor and ceiling thickness in the exported gbXML model.

Spaces / Rooms:
There are two spaces in this test model. One space is located at the first floor, named as "level_1_space_1". The other one is located at the second floor, named as "level_2_space_1".

Special Considerations:

1. The model is 10' x 10' x 22' (including floor and roof thickness)
2. The model has two stories and each story is one space.
3. There is no empty space between the ceiling in lower level and the floor in upper level.
4. All the walls face to an orientation shall be named as: "[orientation]_wall_[custom index]"
5. All the other surfaces shall be named as their function, such as "interior_wall_[custom index]
6. The custom index is an index to differentiate the same type surfaces. The tester can decide how to label the custom index.

Guideline for creating the BIM model:
Figure 1 shows a 3-dimensional isometric view of this test model. Walls locates between the slab floor and the roof.
Figure 2 shows a typical floor plan to indicate dimensions and directions of the space, with wall thickness. The dashed line represents the profile of the shading of the roof.
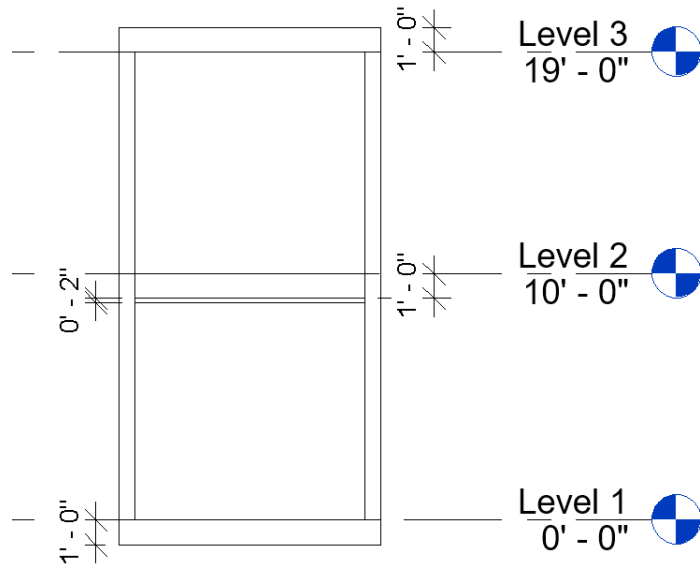**Figure 3** shows a typical section view to indicate positions and dimensions of the slab floor, the height of the roof and the ceiling element.
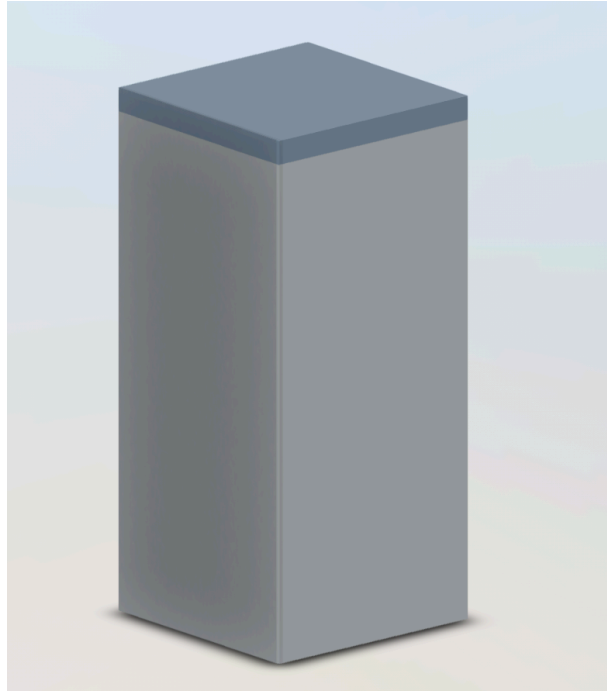
Figure 1. Isometric View
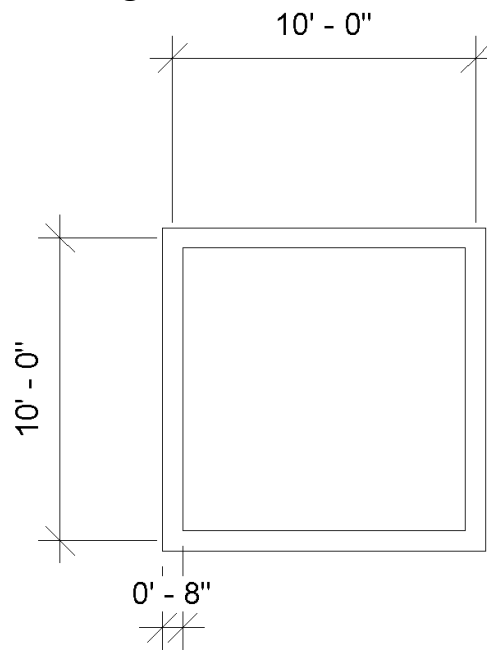
**Figure 2**. Floor and Ceiling Plan View

Figure 3. Section View

Expected Outcomes:

The expected gbXML model consist of two spaces, one is 8.7' x 10' on the second level and one is 8.7' x 8.8' on the first level. In between, there is a 1.2' gap. In addition, both spaces should be correctly enclosed by four exterior wall surfaces, a floor surface and a ceiling / roof surface.
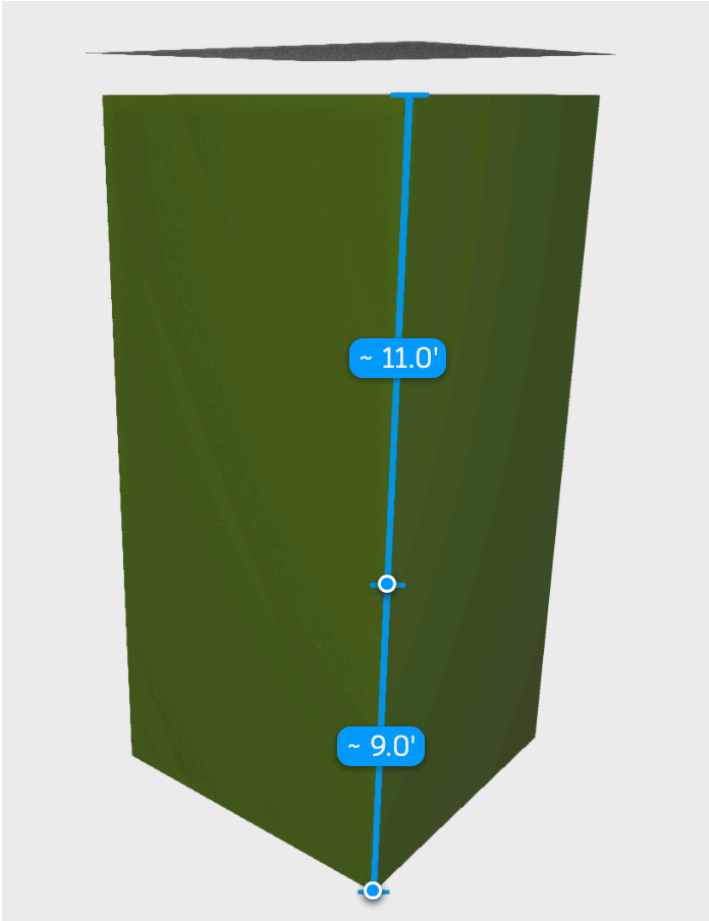
Common Outcomes and Test Results:
The most common issue is wrong dimensions shown in **Figure 4**. In this particular case, the gap was 2.4', which was doubled compared to the thickness of floor and ceiling. In addition, the height of the first floor was reduced to 7.6' and the height of the second floor was increased to 10.8'. A possible reason for causing such error is the setting of the room boundary. Software developer should pay attention to identify the correct room boundary when developing this test case.
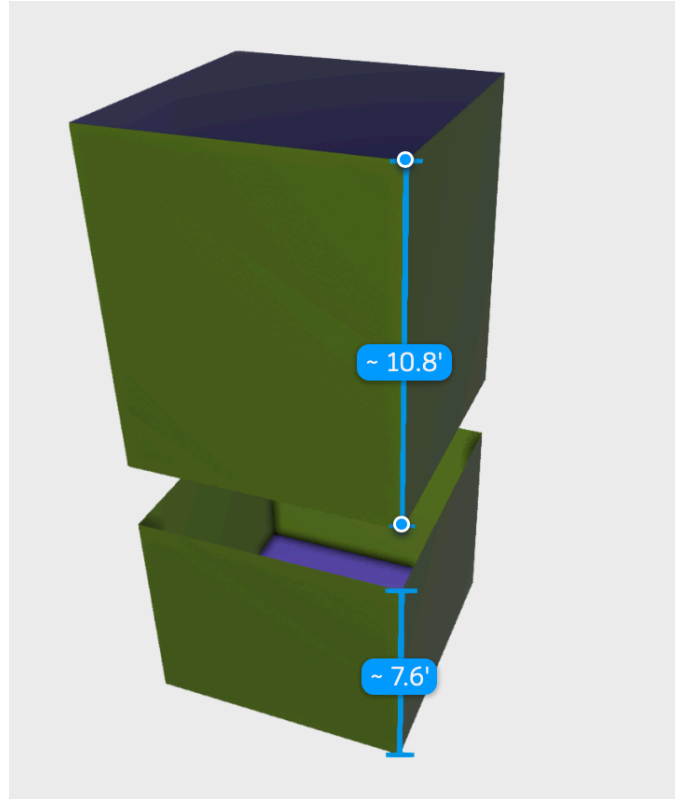
Figure 4. Wrong dimension issue

Another typical issue raised in this test case is the elimination of gap, shown in **Figure 5**. In this example, both the first floor and second floor height were increased to fill out the gap. This behavior will add more volume to both spaces, thus cause inaccurate performance results in the subsequent analysis.

Figure 5. Closed air gap