gbXML Geometry Benchmark Tests
Test Case #28 - Roof Eaves Become Shading Automatically

Introduction

Geometry benchmark tests help to ensure that, as building geometry produced by building designers becomes more complex, the geometry produced for energy and heating and cooling loads analysis maintains the integrity of information that is required for a proper and detailed analysis.

gbXML.org maintains this battery of benchmark tests for vendors and other interested parties to ensure compliance with gbXML.org's standards for geometry accuracy and completeness. These tests are prescriptive and serve as marks of excellence that identify the ability of a technology to translate geometry properly from its native format to gbXML

Test #8 Instructions and Requirements

Space Name	*Your file*
sp-1-Space	*confirmed* ☐
sp-2-Space	*confirmed* ☐
sp-3-Space	*confirmed* ☐

Table 1

This test (Test Case #258 is a simplified three-zone model of a building shaped like a traditional home. It is a simple two-story structure with a small attic formed by a roof with a 30 degree pitch which slopes along one of the cartesian axes. This test is simple and ensures that the CAD/BIM authoring tol is able to automatically break the roof into a space bounding object and a shade object automatically, even though the user has drawn the roof as a single object. It also tests that the south and north walls are broken into two walls for each zone.

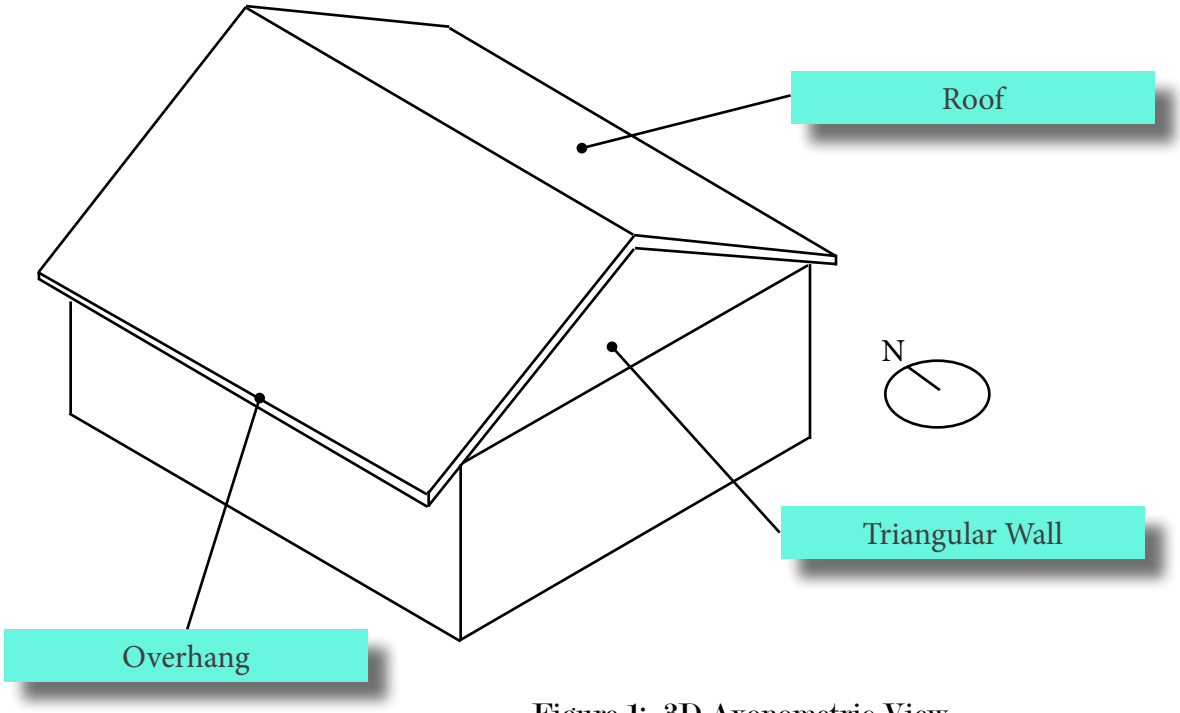

Figure 1: 3D Axonometric View

Level 1 Floor Plan and Dimensions

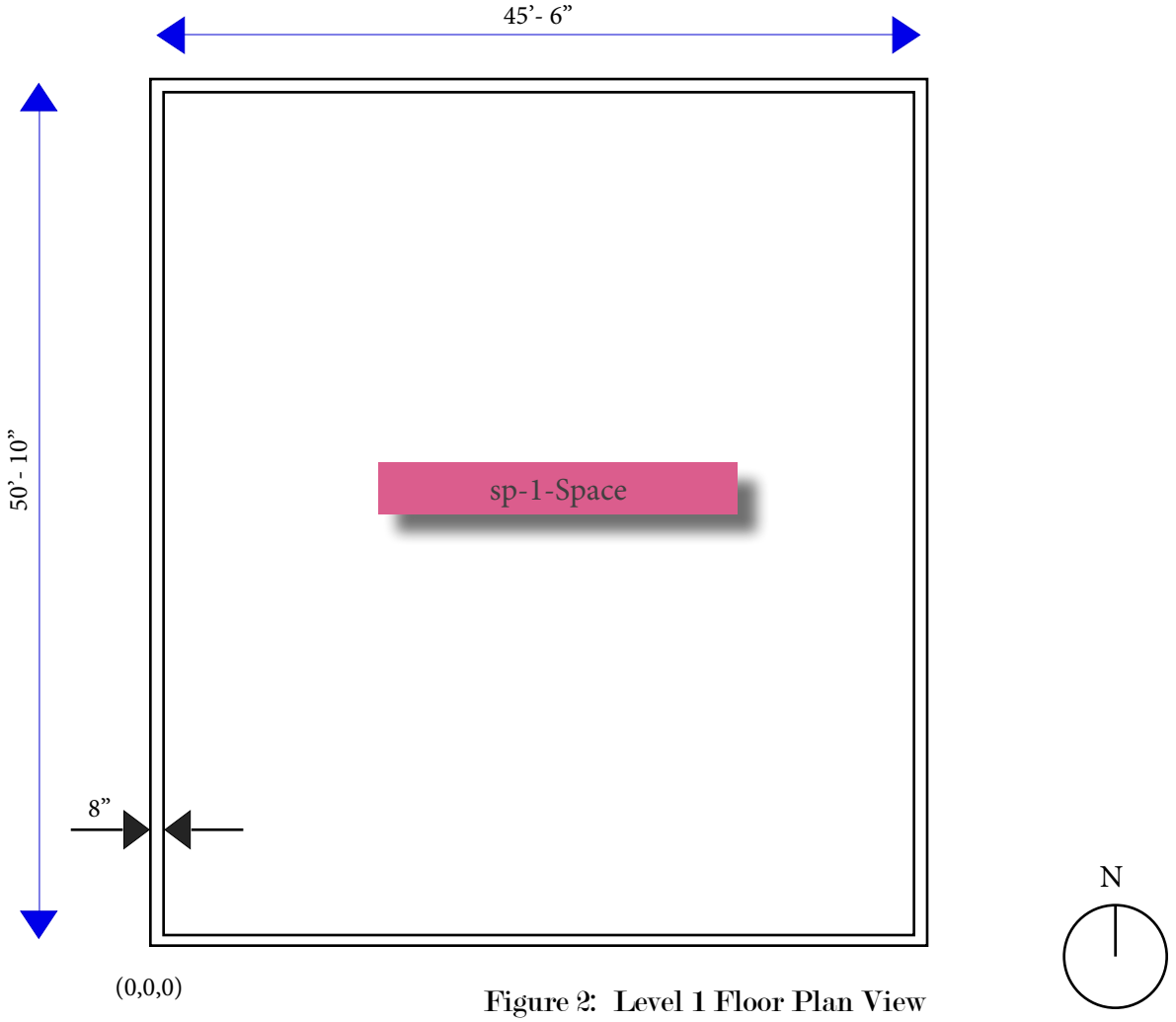

Figure 2: Level 1 Floor Plan View

The floor footprint of Level 1, showing the simple building footprint. Each exterior wall is 8“ and there are no interior walls. The origin of the drawing reference plane is located at the bottom left corner of the model, as shown in Figure 1. Level 2 has an identical floor plan and is not repeated for expediency.

Section Cut Drawing Looking North

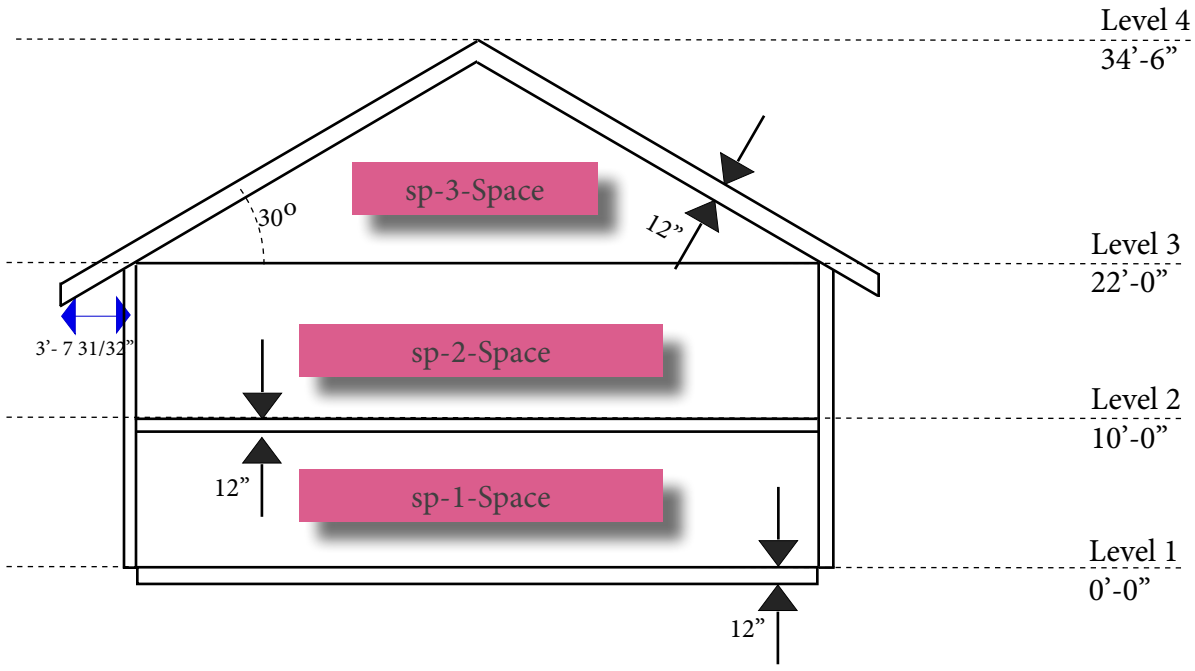

Figure 3: Test Case 28 in Section

A section cut looking north. Heights for each floor are provided, along with the volumes taken up by each of the three spaces. The 30 degree angle is formed between the horizontal plane and the inner surface of the roof objects. The protruding length of the overhang is also shown. Some simple geometry can be used to calculate the actual length of the overhang itself. The thickness of all constructions is 12".

Section Cut Drawing Looking East

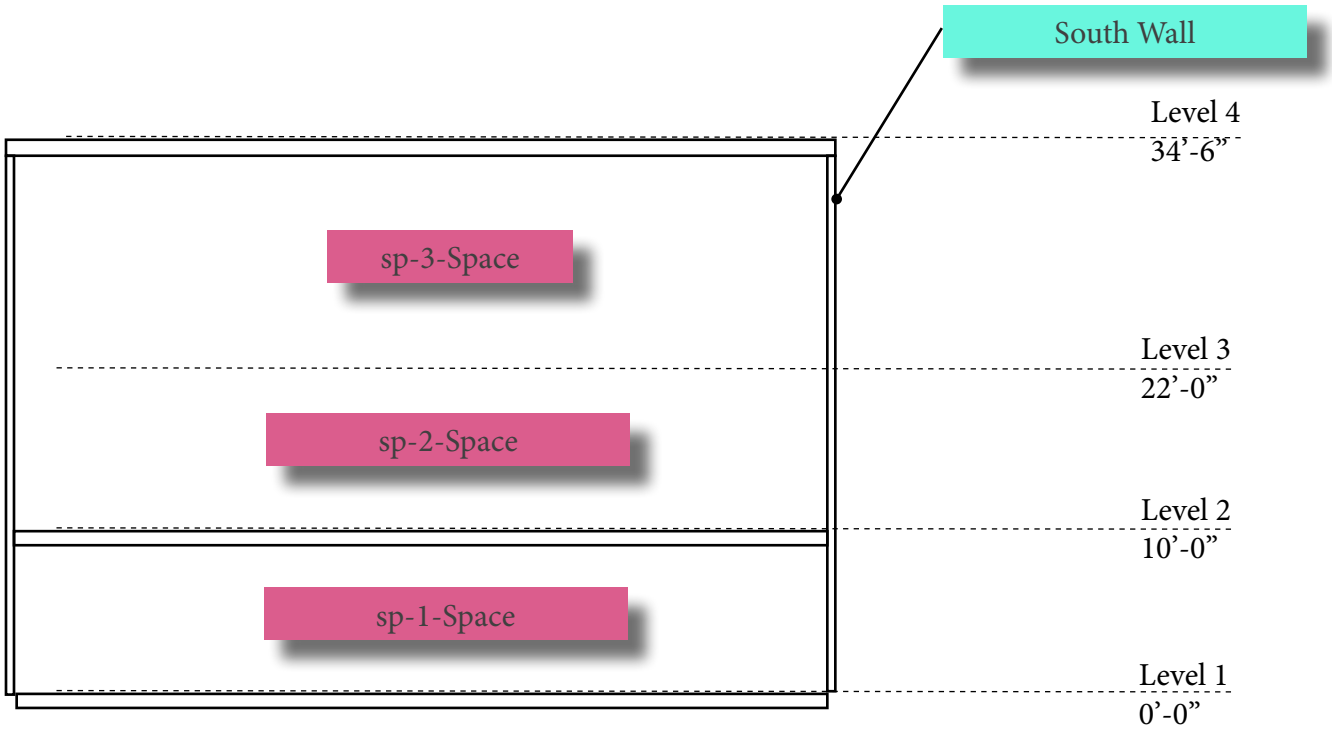

Figure 3: Test Case 28 in Section

A section cut looking east. This section cut highlights that the roof does not create shading devices on the north or south side of the building.

Test #28 Common Outcomes and Test Results

The most common failure is the size of the shading devices that are created do not quite match the standard file. A second common failure is when the volume calculation is incorrect because the sloping roof is defined improperly.

1. ***Detailed Surface Tests may fail for the shading surfaces, because dimensions do not meet tolerance requirements***
2. ***In the case of incorrect volume, the Spave Volume Tests may fail, coupled with failures of the Detailed Surface Tests for certain surfaces, particularly those that represent or interface with the roof.***

Various permutations of the two cases above may occur, depending upon how the CAD/BIM file translates the geometry to gbXML.