

Provisions of Building Code For Wind Uplift Pressure

In general, determination of wind uplift pressures applicable for residential building design is most often based on standard provisions of the building code.

However, when roof geometry is more complicated than that relatively simple "standard" roof shapes shown in the code, careful evaluation is necessary to correctly determine wind pressures, unless a conservative approach is taken.

Standard building code provisions (such as Figure R301.2(8) in IRC 2003) used for determining wind uplift pressures on roof surfaces are taken directly from the general ASCE 7 design standard that forms the basis for all typical building design loads.

However, the IRC building code includes a basic requirement at the beginning of Chapter 3 (R301.2.1.1; IRC 2006) that requires the use of one of the listed reference codes when design wind speed is equal to or greater than the specified value (110 mph in IRC 2000 & 2003; 100 mph in IRC 2006).

- ➔ Since design wind speed for Sun City is 130 mph, provisions of the IRC code for wind design are not applicable. One of the reference codes must be used.

Without going into too much detail, there is a problem with strictly applying the code-specification for use of "one of" the specified reference codes. Essentially, use of more than one code is necessary to perform wind load design when the use of prescriptive IRC provisions is not allowed. For example, when using the ASCE 7 reference code, the NDS code must also be used for wood design.

For further discussion, evaluation of wind uplift pressures in this report is based on ASCE 7-05.

Use of standard code provisions (ASCE 7-05) is strictly allowed only when the building and roof geometry conforms to conditions of the code (6.4.1.2 for components and cladding wind pressure).

However, even if the building might be considered to satisfy basic conditions, the roof may not completely conform with the relatively simple geometry shown in standard diagrams. For such condition (which happens frequently), "engineering judgement" must be employed.

Due to the various intersecting ridge lines and sloping surfaces (planes), roof geometries of Sun City houses do not conform with standard diagrams that define zones of wind uplift pressures on roof surfaces.

The "simplified" Method 1 is most appropriate for design of residential buildings. Therefore, Figure 6-3 of ASCE 7-05 is applicable.

