

## V. Snow Loads on Roofs

The example we discussed in part IV was a very simplistic view of how the slope of a roof affects the pressure placed on the roof by snow and wind. Now, let's look at the way snow loads are actually calculated taking into account not only the slope of the roof, but also thermal effects on the roof, the type of roof surface, and the effect on a gable roof of wind acting on the roof along with the snow.

Ground snow loads for different locations can be looked up in a table or read off of a contour map for snow loads. Generally, the snow load on a flat roof in pounds per square foot is assumed to be 30% less than the ground snow load. If the roof is on a heated structure, a thermal factor of 1.0 is used in calculating snow loads on the roof. If the roof is on an unheated structure, a thermal factor of 1.2 is used in calculating snow loads on the roof. The slope of the roof is a major factor in calculating snow loads on a roof. The steeper the roof, the more snow that is expected to slide off the roof as we have seen in part IV. The type of roof surface also affects the snow load on a roof. A metal roof is slippery in nature, allowing the snow to slide off the roof faster than off of a shingle roof which is not slippery in nature. The slope reduction factor is 1 for roofs with angles of inclination of between 0 degrees and A degrees,  $1 - \frac{(\text{roofangle} - A)}{(70 - A)}$  for roof angles of between A degrees and 70 degrees, and 0 for roof angles greater than or equal to 70 degrees; where A depends on how slippery the roof surface is and whether the roof surface is warm or cold. We will use A = 0 degrees for warm, slippery roofs; A = 15 degrees for cold, slippery roofs; A = 30 degrees for warm, non-slippery roofs; and A = 45 degrees for cold, non-slippery roofs. The formula used to calculate the snow load on a roof is:

$$\text{Roof Snow Load} = (0.7)(\text{ground snow load})(\text{slope reduction factor})(\text{thermal factor})$$

See table below for ground snow loads in pounds per square foot:

Location	Snow Loads in Pounds per Square Foot
South Texas	0
Central Texas	5
Texas Panhandle	15
Central Colorado	30
Wisconsin	50
Tennessee	10
Northern Maine	100
Florida	0
Southern California	5

