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TO: All that may be interested

From: Mike Foley

Re: Snow Loads on Roofs

Date: February 1, 2011

Every so often home owners/property owners contact our office asking about snow loads particularly the buildup of snow on their roofs. They inquire as to "how much snow can my roof support?"

780 CMR Commercial Mass State Building Code Table 1604.11 provides snow load for roofs. The Ground Snow Load ranges from 45 lbs to 65 lbs per horizontal square foot depending on each community and the zone in which it is located. The Residential Code 5301.2(5) for 1 and 2 families' ground snow ranges offer different values again depending on the community and zone of 25 lbs to 50 lbs per horizontal square foot. To determine the snow load for your specific community and zone refer to the chart.

To provide a response to "How Much" requires a little bit of science, math and knowledge of the roof structure and type. A flat roof, gable roof, shed roof gambrels, and roofs with multiple valleys and snow gathering points will vary the weight differential factors as will the number and type of roof coverings effect the value. For rule of thumb example to offer some type of response to the property owner questions, we have to presume that the structure has been constructed to sustain the minimum snow load requirements of the code. The weight of snow/ice, not the depth, is critical in assessing a roof's vulnerability. The water content of snow may range from 3% for very dry snow to 33% for wet, heavy snow to nearly 100% for ice. An inch of water depth weighs 5.2 psf. Thus, a roof designed to a carry a snow load of 20 lbs. per horizontal square foot is expected to support nearly 12 inches of wet, heavy snow. (University of Arkansas Division of Agriculture)

If using the heaviest wet snow value for roof designed to sustain 40 psf of snow load then it can be viewed that it should be capable of supporting nearly 24" inches of wet heavy snow. If the snow moisture content is less, the depth of snow for sustaining can be greater.

The science aspect: measure the moisture content of the snow to determine its weight factor. This can be done simply by taking a 3lb coffee can and pushing it down into the snow to the roof. As you fill the can with snow empty it and keep filling until you reach the surface, melt the snow then pour it back into the can and measure it. Depth of inches x's 5.2 = psf.

Please use this information as tool to assist you and others in reducing danger to their self that could have been avoided. Catastrophic roof failure may not be solely attributed to built up snow, there may be other actions that occur that affect the roof structural stability and sustainability.