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Should I Shovel the Snow Off my Roof?

General: Structures built with a building permit in Plumas County have been required to be designed to meet the snow load for the area in which they were built. Only once since 1970, the winter of 1992-93, have snow accumulations in the county come close to, or slightly exceed, the required design snow load. Therefore, it is unlikely that it will become necessary to shovel snow from the roof of a structure built in Plumas County with a building permit.

The weight of accumulated 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 a wet, heavy snow, to nearly 100% for ice. An inch of water depth weighs 5.2 lbs. per square foot. Thus, a roof designed to carry a snow load of 60 lbs. per square foot is expected to safely support nearly 5' medium/wet snow.

An important first step in deciding to shovel is to ask, is it possible and practical, with the available equipment and labor, to remove the snow and ice? What about the health and safety of the individual who is working on a snow and ice covered roof? If you remove the snow, brittle shingles, skylights, plumbing vents, etc., may be damaged, or the person removing snow may be injured. The expense and liability of having someone else remove the snow needs to be considered before taking action (most homeowner insurance policies do not provide workers' compensation insurance coverage for this type of work).

The next step is to determine if the current snow load on the roof is greater than the load-bearing capacity of the building. The table below lists the snow load in lbs./sq.ft. that structures in various areas of the county have been required to meet or exceed:

Table 1 – Design Snow Load for Various Areas of Plumas County

Area	Lbs./Sq.Ft.	Area	Lbs/Sq.Ft.
Beckwourth	60	Lake Almanor	100
Belden	40	Lake Davis	100
Blairsden	80	La Porte	200
Bucks Lake	200	Little Grass Valley	200
Canyon Dam	100	Meadow Valley	80
Chester	100	Portola	60
Chilcoot	60	Quincy	60
Clio	80	River Valley Estates	60
Crocker Mountain Estates	100	Sierra Valley	60
Dixie Valley	100	Tobin	40
Frenchman Lake	100	Twain	40
Genesee	80	Valley Ranch Estates	80
Graeagle	80	Warner Valley	125-150
Greenville	60	Whitehawk Ranch	80
Indian Valley	60	Thompson Valley	60-80
Johnsville	150	Taylorsville	60

Estimated Roof Load: Collecting samples of snow/ice from the roof surface is the most accurate way to determine the snow load on the roof. However, this is often difficult and hazardous. Table 2 can be used to provide a rough estimate of snow load. From Table 2, a roof with 58 inches (approximately 5') of medium/wet snow has approximately 60 lbs/sq.ft of snow load on the roof. For a structure located in an 80 lb./sq.ft or greater design snow load area (from Table 1), shoveling snow off the roof would be considered unnecessary. In a 40 lb/sq.ft. design snow load area, probably time to shovel. In a 60lb/sq.ft design snow load area, shoveling may be recommended if an accumulation of significant additional snow or rain were predicted.

Table 2 - Estimate of Snow Load on Roof

Estimated Snow Load (lbs./sq.ft.)	Light/Dry Snow (5% Moisture) Inches on Roof	Medium/Wet Snow (13% Moisture) Inches on Roof	Heavy/West Snow (33% Moisture) Inches on Roof	Ice (92 %) Inches	Water (100%) Inches
40	154	38	23	8	8
60	231	58	35	13	12
80	308	77	47	17	15
100	384	96	58	21	19
150	577	144	87	31	29
200	769	192	116	42	38

Table modified for higher snow loads from table created by Dr. Karl VanDevender & Doug Petty - University of Arkansas

When there is snow on a roof, additional rain can add more weight than snow, as the existing snow acts as a sponge, absorbing and holding the water on the roof – significantly increasing the water content of the snow, which increases the load on the roof.

Actual Roof Load Sampling Procedure: Prior to sampling snow loads on the roof, safety risks should be weighed against the potential benefits of obtaining a sample. The following snow load sampling procedure can also be taken on the ground, is much simpler and safer, and generally provides fairly similar results as the actual roof sample.

Necessary Tools for Snow Sampling:

1. A length of 4" inside diameter round pipe, a foot or so longer than the maximum depth of the snow to be measured. PVC sewer pipe works well.
2. Access to an accurate scale + / - ¼ pound accuracy (produce scale at grocery store).
3. Square edge shovel.
4. Thin plastic produce bag.

Snow Sampling Procedure:

Step 1 – Select an area of roof that is representative of the snow over the whole roof. Generally, the best samples are taken from the center third of a roof (measured from the ridge to the eave). Loads on these areas are typically the most vital to assess the rafter's strength capabilities or the potential for failure.
In some cases, you should be concerned about the snow/ice loads on:

- Roof overhangs (especially large overhangs projecting several feet beyond the horizontal support), especially if there is substantial ice buildup
- Multilevel roofs (when the lower roof is subject to an accumulation of sliding or drifting snow or accumulation of snowmelt)
- Valleys (subject to substantial snow or ice accumulation due to drifting, sliding or melting)

Step 2 – Use the 4" pipe to take a sample. Push the pipe slowly straight through to roof (rotating the pipe sometimes makes this easier) and hold in place (being careful not to damage the roofing material). Remove snow from the side of pipe to expose one side of the pipe. Slip flat edge of shovel under bottom of the pipe. Remove pipe and shovel at the same time, carefully, so as not to lose any snow from pipe.

Step 3 – Empty all of the snow from pipe into plastic bag. Seal plastic bag.

Step 4 – Weigh plastic bag on an accurate scale. The scale needs to be accurate within ¼ pound.

Step 5 – Multiply weight of the snow sample by 11 to get actual snow load on roof, in pounds per square foot.

Conclusion - Should I shovel my roof? If there is detectable sagging of the roofline or horizontal deflection of the walls, doors or windows that are now hard to open, the load-bearing capacity probably has been exceeded, and removing some of the snow from the roof is recommended.

There are significant potential dangers of shoveling snow from a roof. In addition to damage to the roofing materials, there are dangers to the shovelers from items hidden by the snow: "hot" electrical wires, skylights, chimneys, plumbing vents, etc. Additional dangers are sliding off the roof, falling off a ladder, overexertion, or injury from falling ice and snow.

Should you decide to shovel your roof, it is important not to shovel all the snow off only one side of the roof, rather shovel a portion off all sides equally, a little at a time. Generally it is not necessary to remove all the snow from the roof, leave a foot or so of snow on the roof so as not to damage roofing materials. Take extreme caution not to shovel the snow onto propane tanks or regulators.

In conclusion, use the data provided herein to assist in weighing the benefits versus the dangers of shoveling snow from a roof. The conclusion is likely to be different for each homeowner. If the decision is not clear, consulting with a local structural engineer or other professional who is knowledgeable in construction practices may be very helpful.