Heavy Snow Loads

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The recent accumulation of snow in many areas throughout New York state has caused some agricultural buildings to fail. Failure can be the result of several items linked to the snow load present on the building. These items include but are not limited to:

- Improper building design
- Improper building construction
- Actual snow load exceeds design snow load
- Imbalance of snow load on roof
- Failure of one key member causing others to fail as a result of load transfer (domino effect)

Pre-engineered post frame agricultural buildings are designed to withstand a certain level of wind and snow loading and should withstand any snow loads that are below the "design value". For example, if the given snow load is 30 lbs. per square foot acting on the building and it was designed for a design load of 40 lbs. per square foot, then there should be no load carrying problem. Unfortunately, there are agricultural buildings out there that have not been designed for any particular loading at all. These building have a much higher probability of failing as a result of the current snow accumulations we are seeing.

So, how do we know if a building is going to fail? For a pre-engineered building, we can check the actual snow load on the building against the design snow load. If the actual load is less then the design load, then failure is not eminent. Table 1 can be used as a guide to estimate the snow load on a barn. Compare the table value against the design value to see where ou stand. The table cannot be used for a non-engineered structure.

Wood structures will show stress before they fail unlike metal structures that usually will not. For a wood structure, the following audible and or visual signs may be noticed prior to failure:

- Creaking or moaning in the building
- Bowing of truss bottom chords or web members
- Bowing of rafters or purlins
- Bowing of headers or columns

Table 1. Snow Load Based on Accumulation Depth

Snow Depth on Roof (Ft.)	"Dry Snow" (lbs./sq.ft.)	"In Between Snow" (lbs/sq. ft.)	"Wet Snow" (lbs./sq. ft.)
1	3	12	21
2	6.5	24	42
3	9.5	36	62
4	12.5	48	83
5	15.5	60	104

If these signs are present, consideration may be given to evacuating animals from the barn and it is certainly recommended to evacuate all humans from the structure.

One option commonly considered to relieve loading from the barn is to shovel the roof. Experienced individuals who are properly trained and protected should only do this. ***Attempting to save a barn is not worth risking lives over.*** Shoveling the roof without the proper approach may actually cause more damage than good by creating an unbalanced load on the roof.