How to Prevent Farm Building Failures & Create Dependable Assets

Aaron J. Halberg, P.E.

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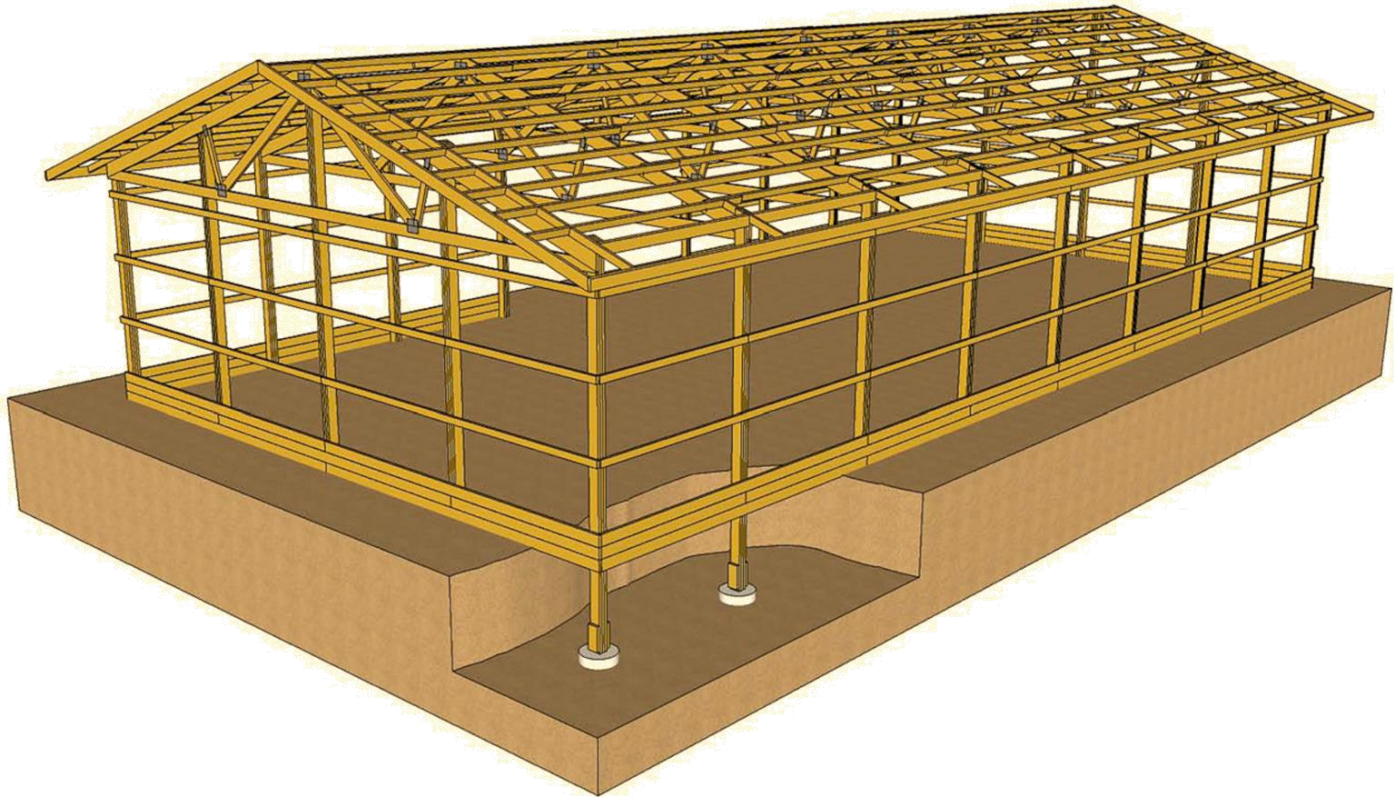
What is Post Frame?

Not “Timber Frame”

Often used in farm buildings

Known as “Pole Barns” in the past

Often used for Commercial and Residential buildings, in addition to Agricultural

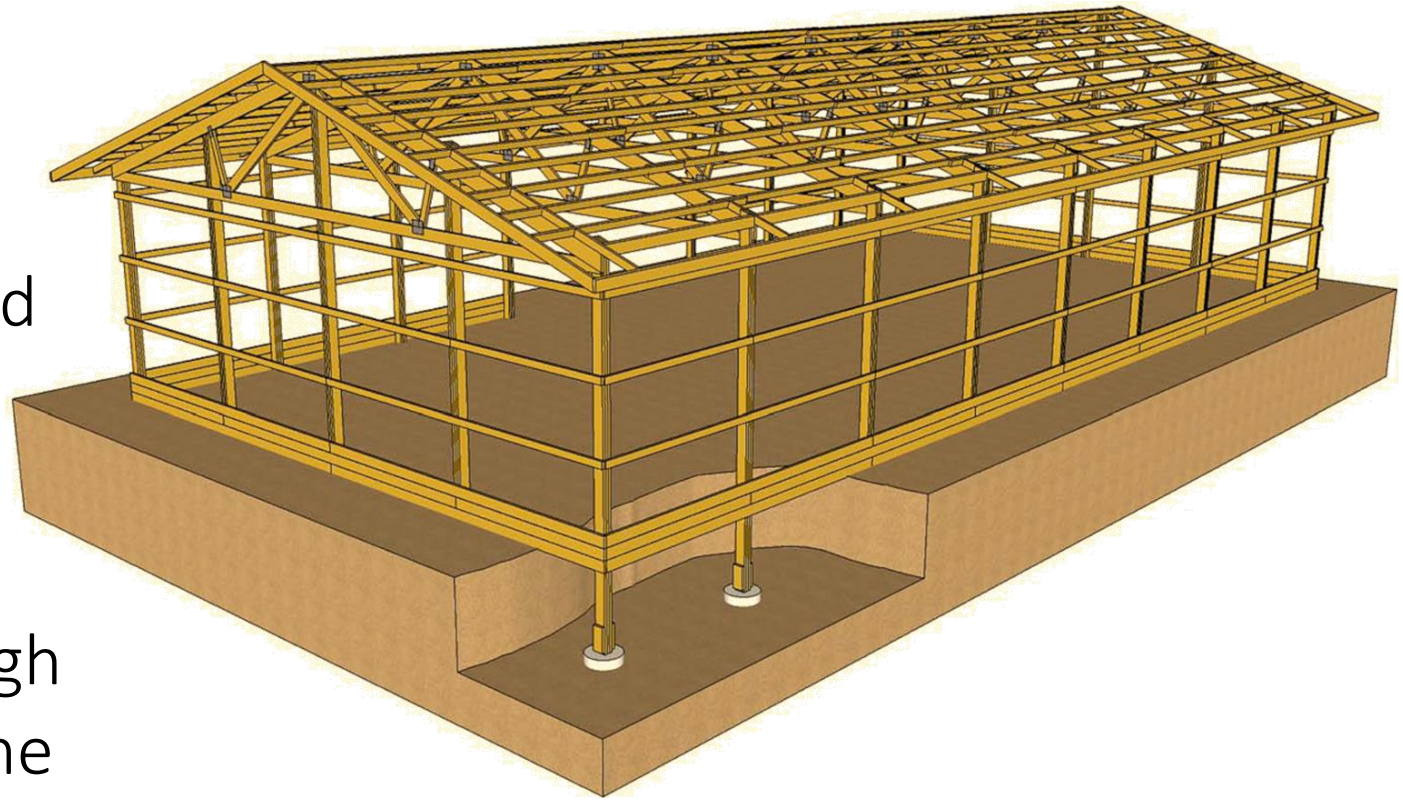


The NFBA - National Frame Building Association and the WFBA - Wisconsin Frame Builders Association represent and promote the advancement of the Post Frame building industry

WISCONSIN FRAME BUILDERS ASSOCIATION WFBA

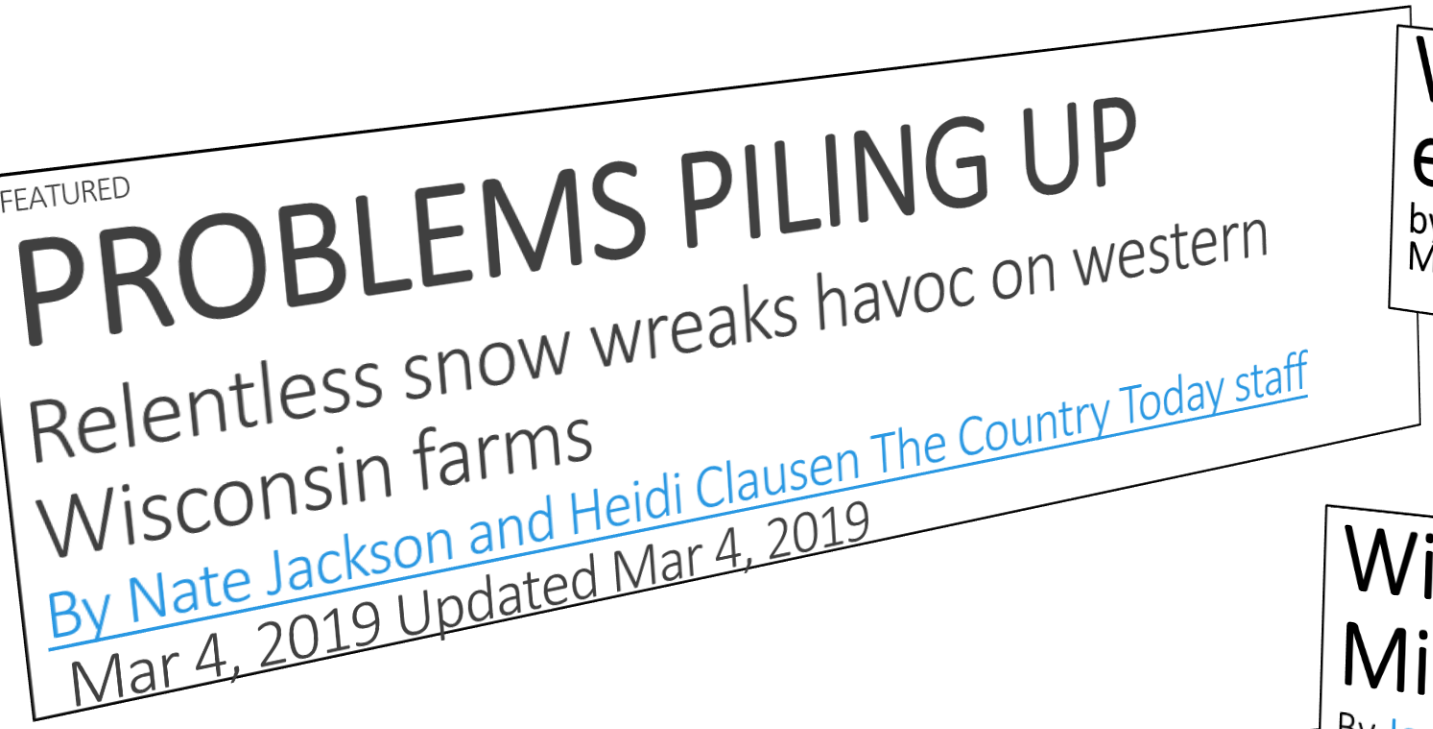
NFBA NATIONAL FRAME BUILDING ASSOC.

Post Frame:



A building characterized by primary structural frames of wood posts as columns and trusses or rafters as roof framing. Roof framing is attached to the posts, either directly or indirectly through girders. Posts are embedded in the soil and supported on isolated footings, or are attached to the top of piers, concrete or masonry walls, or slabs-on-grade. Secondary framing members, purlins in the roof and girts in the walls, are attached to the primary framing members to provide lateral support and to transfer sheathing loads, both in-plane and out-of-plane, to the posts and roof framing.

“Dairy barns” have changed a bit since the 1950’s. New barns are often “Post Frame” buildings

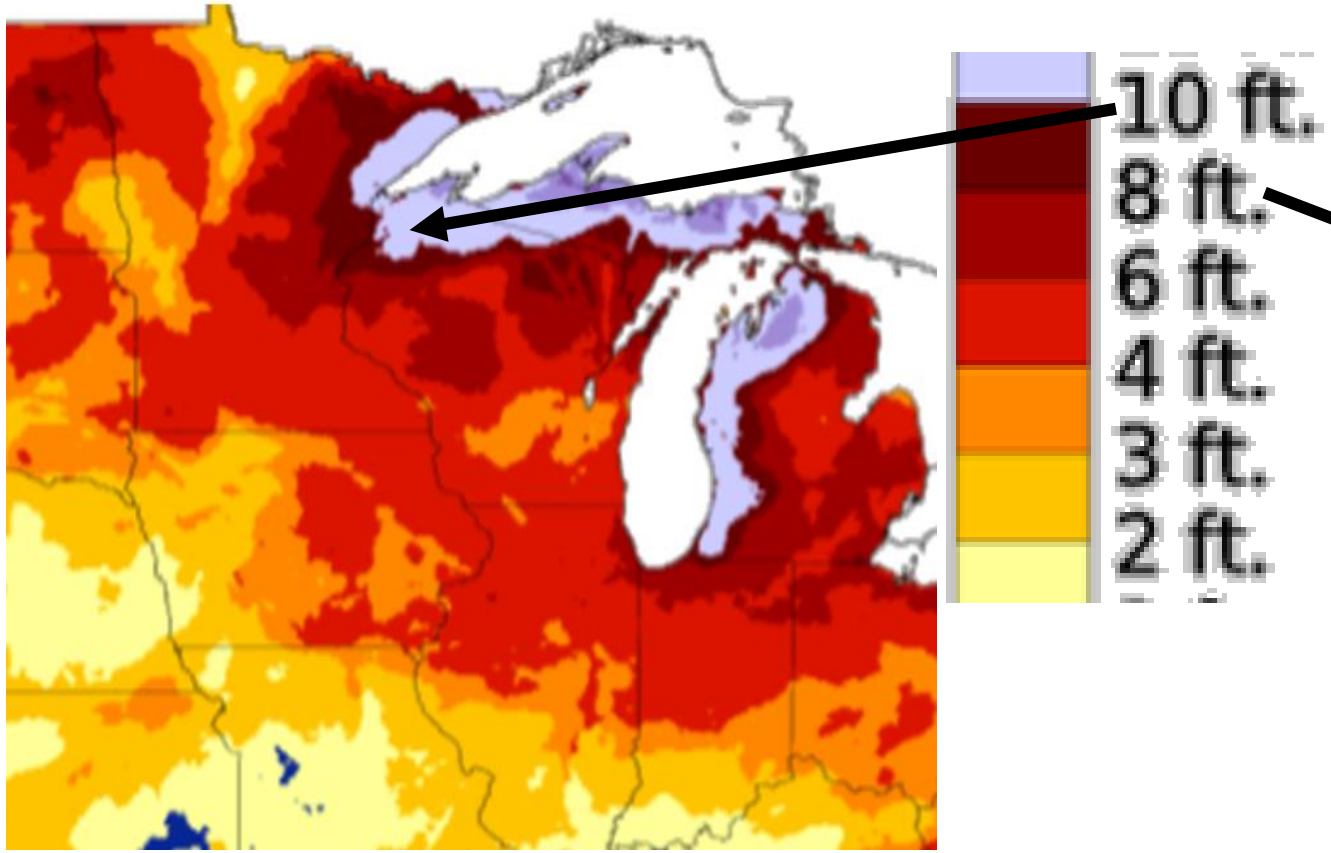

FEATURED
PROBLEMS PILING UP
Relentless snow wreaks havoc on western Wisconsin farms
By Nate Jackson and Heidi Clausen The Country Today staff
Mar 4, 2019 Updated Mar 4, 2019


Weyauwega business evacuated after roof bows
by Amanda Becker, FOX 11 News
Monday, March 4th 2019

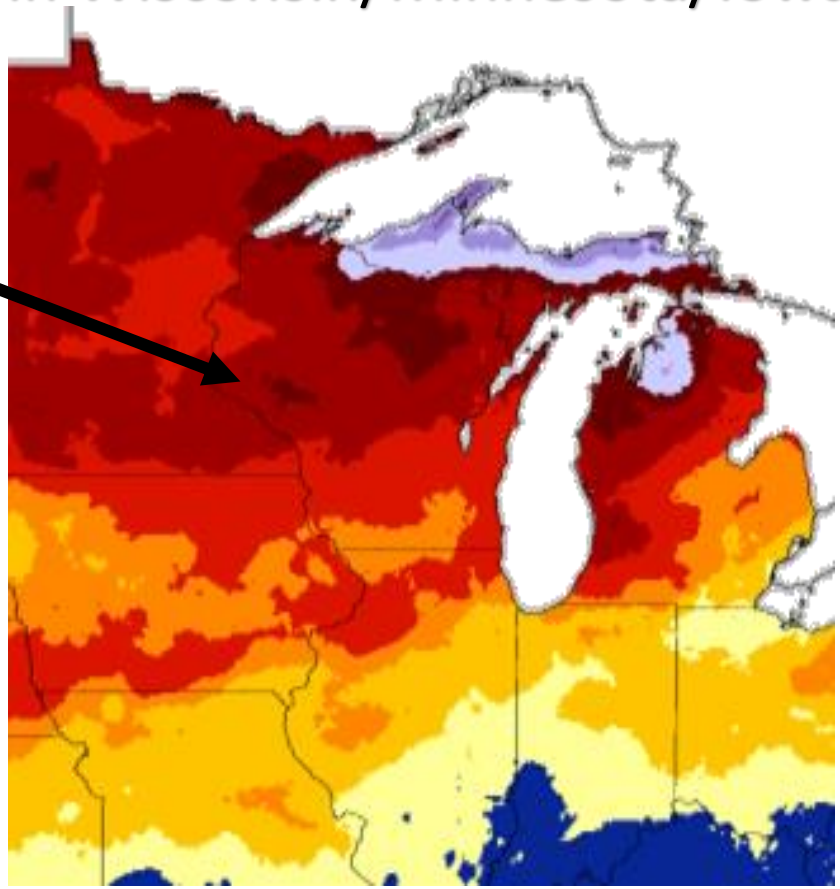

Winter claims at least 19 Minnesota dairy barns
By Jonathan Knutson on Feb 28, 2019 at 10:17 a.m.
Duluth-News Tribune

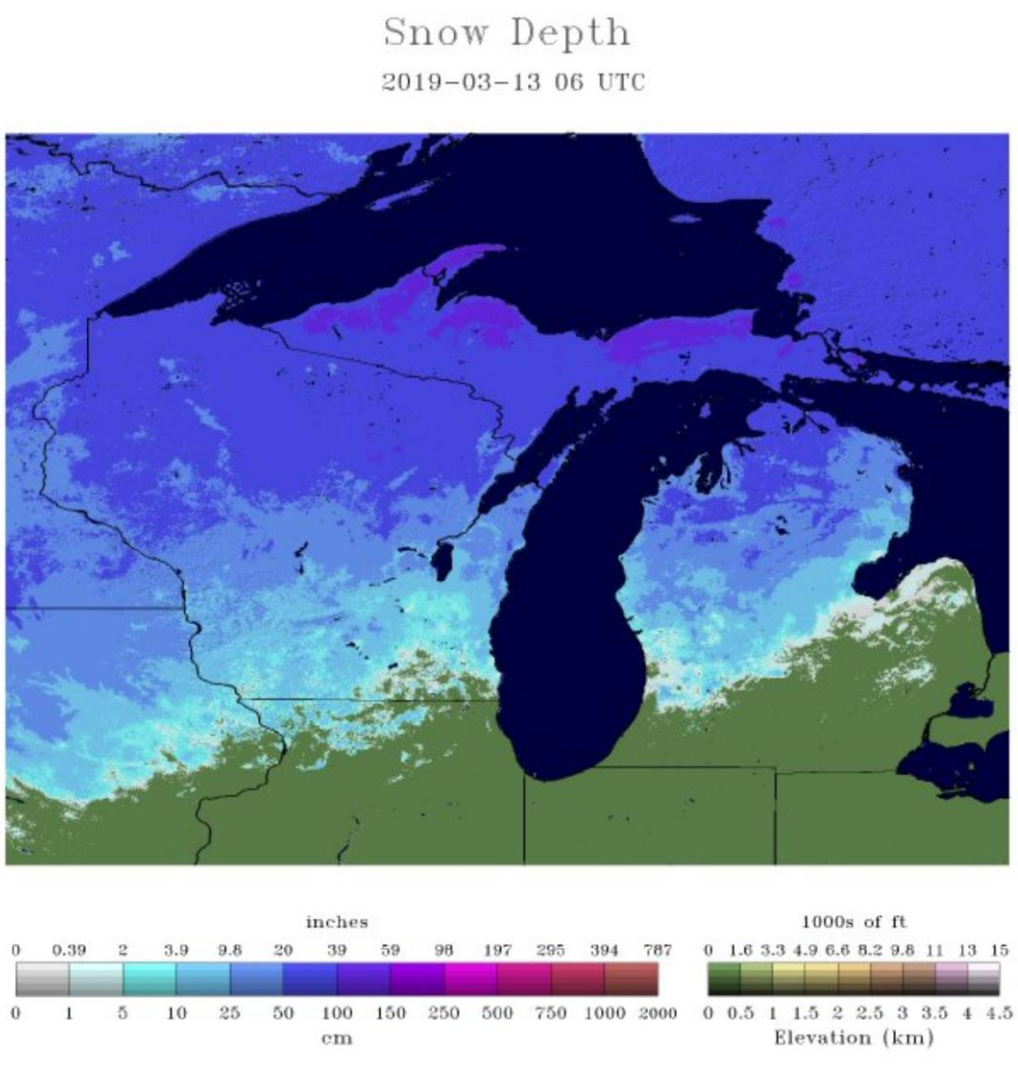

Blizzard packs a punch for already burdened farmers
Carol Spaeth-Bauer, Wisconsin State Farmer Published Feb. 27, 2019

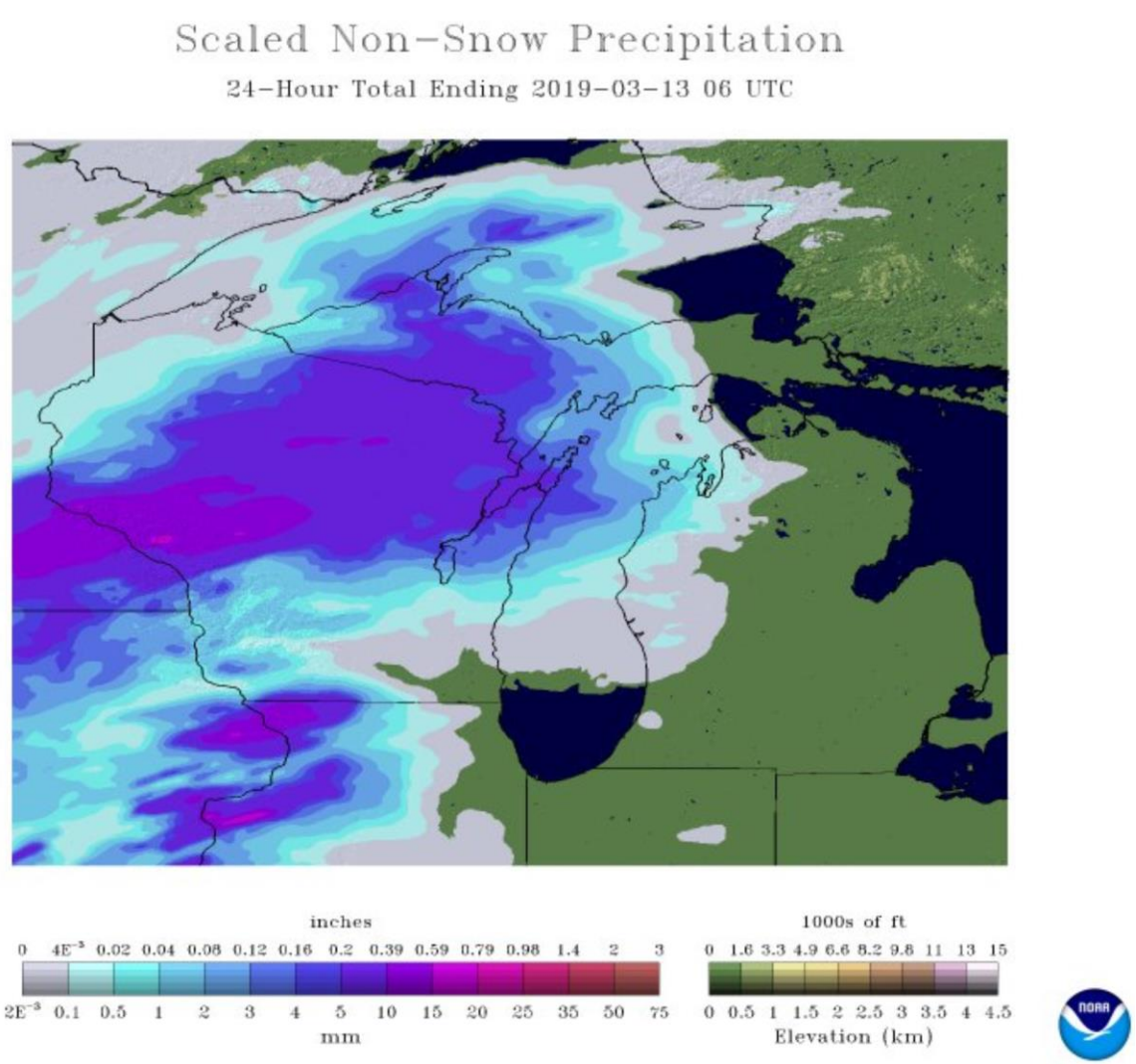
2013-2014 – heavy snow in Northern Wisconsin



2018-2019 – heavier than normal in Wisconsin/Minnesota/Iowa







And last winter (2019) in mid-March,
this region received rain on top of snow

By way of conversation with Rural Mutual last spring, they insure about 1/3 of all farm buildings in the state, and their claims from the last catastrophic winter weather events:

April 2018: $11.1 Million

February – March 2019: $12.6

If $23.7M is 1/3 of total, $71.1Million Total?

Avoiding Common Building Failures in Post Frame buildings:

Top Causes of Post Frame Building Losses per Nationwide:

- Improper Bracing of Trusses - Lack of lateral braces to locations that require lateral restraints
- Improper Purlin to Truss connections - Smooth nails or lack of clips from purlins to trusses
- Failure to account for Unbalanced or Drifting Snow, which affects truss members differently than balanced snow

Unbalanced Snow

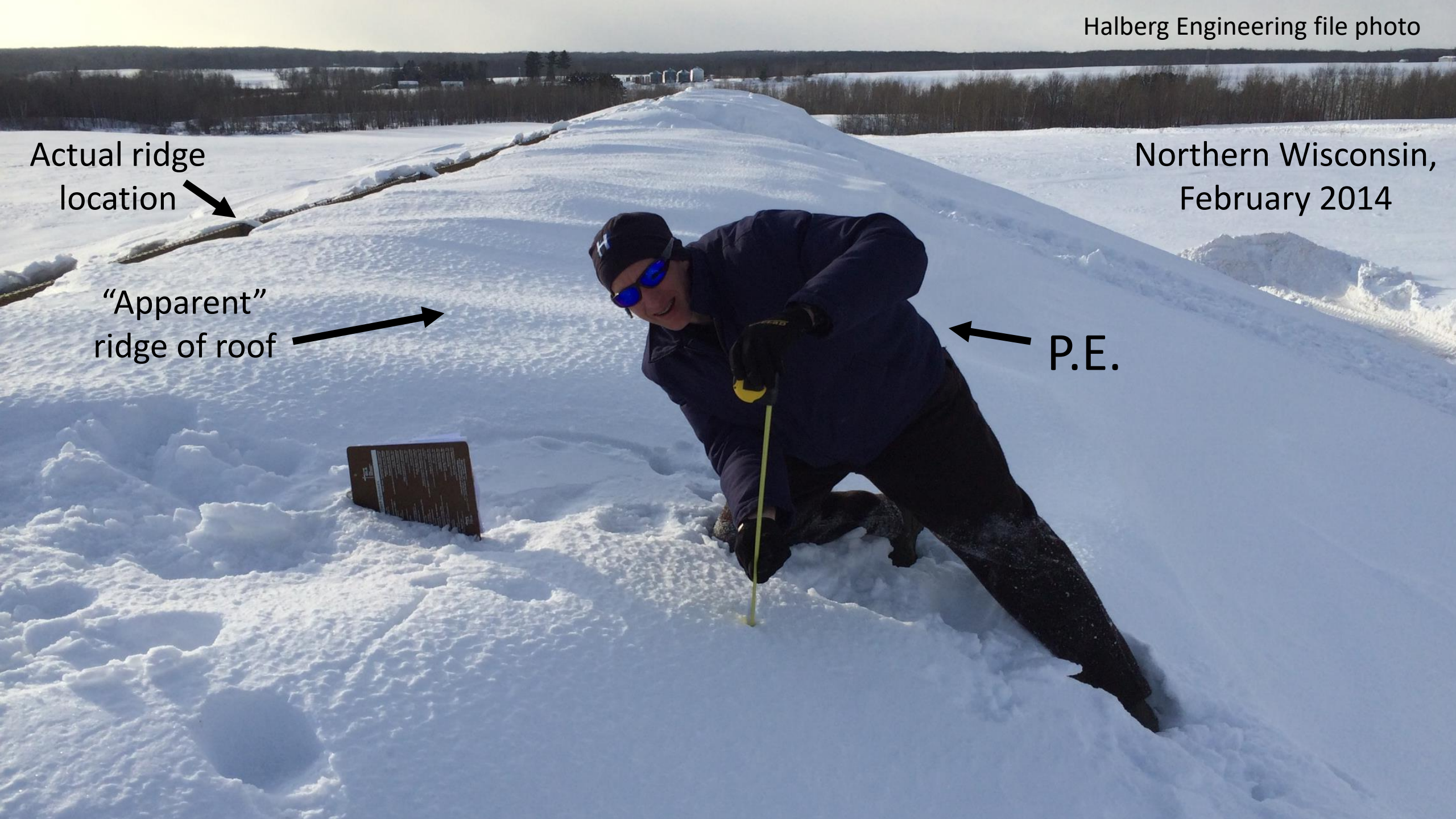
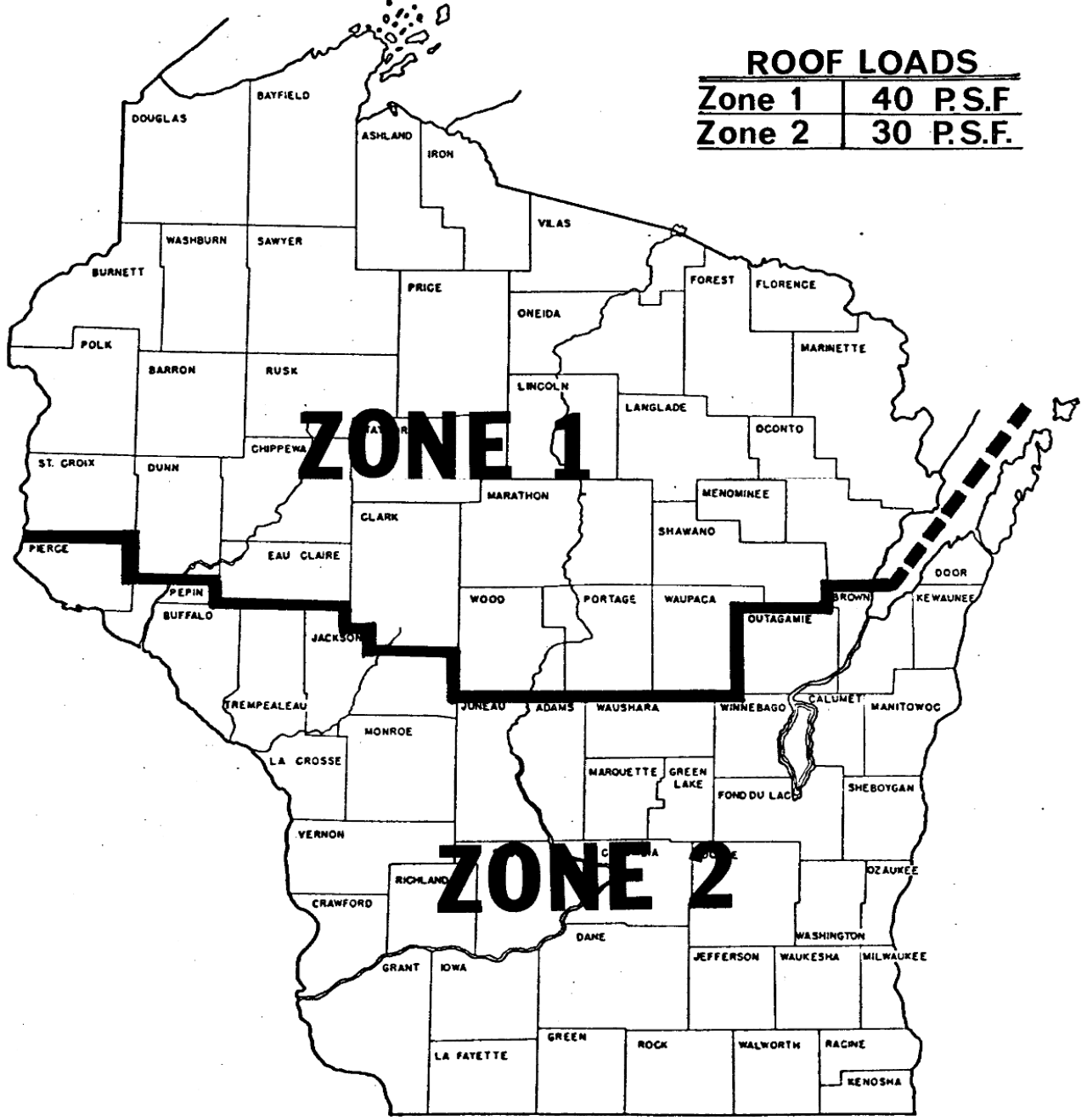

Halberg Engineering file photo
Actual ridge location
Northern Wisconsin, February 2014
"Apparent" ridge of roof
P.E.


Photo by Aaron Halberg, P.E.
Unbalanced Snow on the same building shown from a different angle



Before 2002, the Commercial Building Code had just two Roof Loads:
30psf in the South &
40psf in the North
ASCE 7 is much more technical and complex

Can ASCE 7 be used for “Ag” buildings?

Use or Occupancy of Buildings and Structures	Risk Category	Snow Load Multiplier (I_s)
Buildings and other structures that represent a low risk to human life in the event of failure	I	0.80
All buildings and other structures except those listed in Risk Categories I, III, and IV *(I consider this “Normal” or “Default”)*	II	1.00
Buildings and other structures, the failure of which could pose a substantial risk to human life. *(more descriptions listed)*	III	1.10
Buildings and other structures designated as essential facilities. *(more descriptions and considerations listed in ASCE 7)*	IV	1.20

If you have a farm building with workers inside on a regular basis, what Risk Category should be used?

WARNING SIGNS

Signs / decisions which could contribute to a premature building failure

Warning Signs: Could contribute to Building Failure

1. Building design documents not prepared / reviewed by a professional engineer
2. A certified truss print is (mis)understood to be an engineered building design
3. No conversation with owner about design loads / building risk category

Warning Signs: Could contribute to Building Failure

(continued)

4. Project Design loads are set lower than the Minimums determined by a qualified interpretation of ASCE 7
5. Special Snow loads are ignored, such as drifting, unbalanced, and sliding snow
6. Special hazards of high moisture and/or highly corrosive environments are not addressed
7. Aging buildings not properly maintained nor routinely inspected for continued use

Recommended Practices – Farm Building Design and Construction

CREATING RELIABLE AND LONG-LASTING BUILDINGS

Recommended Practices

Presented in order of priority:

1. Decide on proper Building Risk Category (I - IV), then determine appropriate ASCE 7 design loads
2. Decide whether to exceed these minimum loads
3. Use Quality Materials
4. Work with a High-Quality and Reputable Builder
5. Construction Plans certified by a Professional Engineer

Recommended Practices

Presented in order of priority (continued):

6. Truss Design Documents prepared and certified by a Professional Engineer
7. Post-Construction Compliance Inspection
8. Technical Supervision during Construction
9. Develop and Follow a Maintenance and Inspection Schedule

DISCUSSION – Q&A

HALBERG ENGINEERING LLC

Presenter: Aaron Halberg, P.E.
aaron@halbergengineering.com

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