

Winter Horse Management Webinar Series

Winter Facility Management

01.13.21

NDSU

EXTENSION

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mail:
U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410; or

fax:
(833) 256-1665 or (202) 690-7442;

email:
program.intake@usda.gov

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program.intake@usda.gov

Esta institución ofrece igualdad de oportunidades.

Locations and Numbers

- 79 registered
 - Germany/France
- # of Horses
 - 1-5
 - 12-15
 - 50-75



Speakers

- **Shane Kjellberg, PE**, k2s@daktel.com
 - Structure management
- **Mary Keena**, mary.keena@ndsu.edu
 - Winter manure management
- **Paige Brummund**, paige.f.brummund@ndsu.edu
 - Windbreaks, Fence maintenance, Bedding, Blanketing
- **Rachel Wald**, r.wald@ndsu.edu
 - Waterers, Feed access and pen maintenance, Horse care

K₂S Engineering, Inc. Established June 2003

- K2S Engineering Inc. is a small family owned engineering firm located near Ypsilanti, North Dakota.
- K2S specializes in Agricultural Engineering, and Environmental Consulting.
- The firm comprises of one Professional Engineer, Shane Kjellberg, and four engineering technicians, Jodi Kjellberg, Tonia Kjellberg, Seth Kjellberg and Cody Henne.

K₂S Engineering, Inc.

- K₂S Engineering focuses on sound design practices and getting those designs constructed. We work with the producer and the governing unit to get the best possible results for everyone involved. There is over 30 years combined experience in this area of engineering and environmental consulting.
- Licensed in ND, MN, SD, MT, WY, IA.

Pen Considerations

- Individual pens – sand base or rubber
- Lanes, traffic areas – concrete
- Outdoor Pens – earth base 3-5% slope
- Animal density – horses 400-500 sq. ft. minimum
- Feeding/watering areas – consider heavy use protection

Building Considerations

- Materials – Steel vs. Wood
- Orientation
- Animal density
- Feeding/watering areas
- Lighting – Natural and artificial

Rafter vs. Roof Truss



Hoop Barn



Engineering Considerations

- Building Specifications
 - Wind & Snow Load ASCE 7-02
 - Foundation Analysis
 - Pre-engineered Buildings
 - Building Codes
 - Materials



Engineering Considerations Continued

- Quality Control/Assurance



Operation & Management

- Repairs, ventilation, maintenance



Manure Management

- Manure management
- Manure removal during extreme conditions
- Moving frozen manure
- MANURE

- Let's chat!
 - Type in ideas



Manure Management Considerations

- What kind of equipment do you have access to?
- Where are you going to stack it and why there?
- How will you manage it once it thaws?
 - Barn manure and pen manure
 - Can you do something now to save yourself some time and trouble later?
 - Composting
- Spreading

Barn Manure and Pen Manure



Manure Stacking/Stockpiling Guidelines - ND

- Short-term Manure Stockpiles
 - Manure may **not** be stockpiled for **more than** nine months at short-term stockpile locations.
 - The same location cannot be used from year to year.
- Permanent Manure Stockpiles
 - Manure stockpiles **for more than** nine months must be stored at a permanent stockpile location.
 - Involves soil investigation and regulatory oversight.

Stockpiling Site Selection

- **Sandy soils have rapid permeability** that allows nitrate to move quickly through the soil to ground water (leaching), while **loamy or clayey soils have slower permeability** that helps retain nitrate in the soil profile.
- Depth to ground water and location of surface water

Stockpiling Site Selection

Manure stockpiles may not be located:

- In gravel pits, or any other excavations;
- Along streams or lakes;
- Within a flood plain; or,
- Within 50 feet of a private water supply well or 100 feet of a public water supply well

Can be covered with plastic to reduce odors and flies

- Anchor securely!

Composting

- Mixture of organic residues
 - Piled
 - Mixed
 - Moistened
 - Thermophilic decomposition
- Results
 - Crumbly, low odor, stable nutrient-rich soil amendment that lacks weed seeds, pathogens, and has decreased 50-65% in volume.



Basics of Composting

- Moisture
 - 40-65% of pore space
 - “wet rag test”
- Temperature
 - Ideal = 131° F for 15 days
 - Kills pathogens
 - Kills weed seeds



Basics of Composting



Mixing Tools

- Payloader
- Front-end loader
- Skid-steer
- Turner
 - Eco-mixer for smaller scale operations
- Pitchfork

Basics of Composting

- Mixing
 - Helps maintain temperature
 - $> 5\%$ of pore space = O_2
 - 10 days to 2 weeks
- When is it done?
 - Temperature no longer spikes after turning
 - As little as 6 weeks or up to 6 months
 - Depends...

Basics of Composting

- Now what?
 - Let your pile cure until it reaches ambient temperature
- Nutrient considerations
 - Stable source of N
 - ~20% available vs. 50% in fresh manure
- Spread at agronomic rates as fertilizer.

Working With a Custom Manure Hauler



Paige Brummund

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ND Custom Manure Hauler Equipment Examples





At-home Spreading Options

- Small, pull type, ground driven spreader
- Pulled by ATV, lawn mower, horse
- Examples:
 - ABI Classic Spreader
 - Loyal Manure Spreader
 - Newer Spreader 225

head
ground capacity
vehicle
spreading
variable
shredding

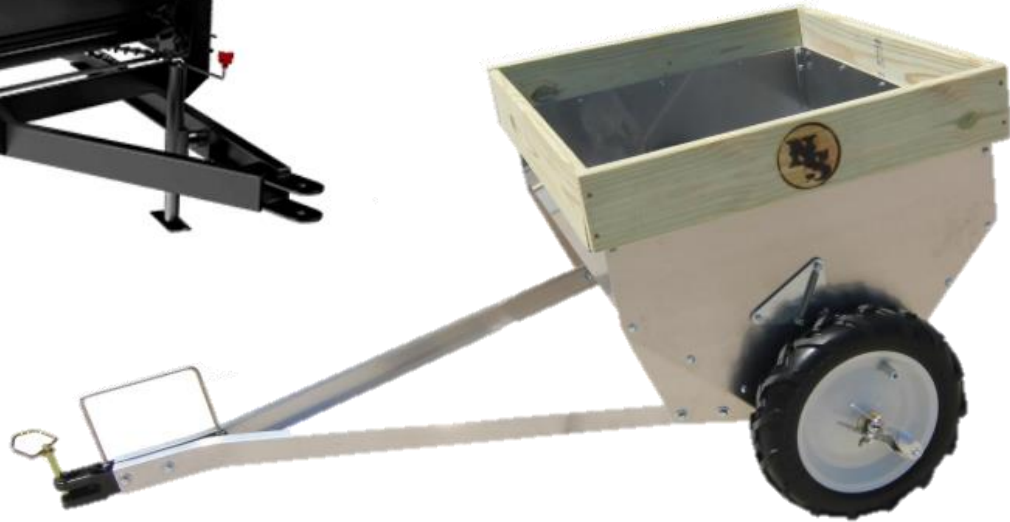
Bushels/Ton of Manure

- 1 bu./1.25 ft³
- 1.0 ft³/7.5 gal
- 1 gal/8.3 lbs.
- 2000 lbs./1 ton

- 26 bushels/ton manure
- Recall – one horse produces approx. 1 ton manure/month or 12 tons manure/year = 312 bushels.



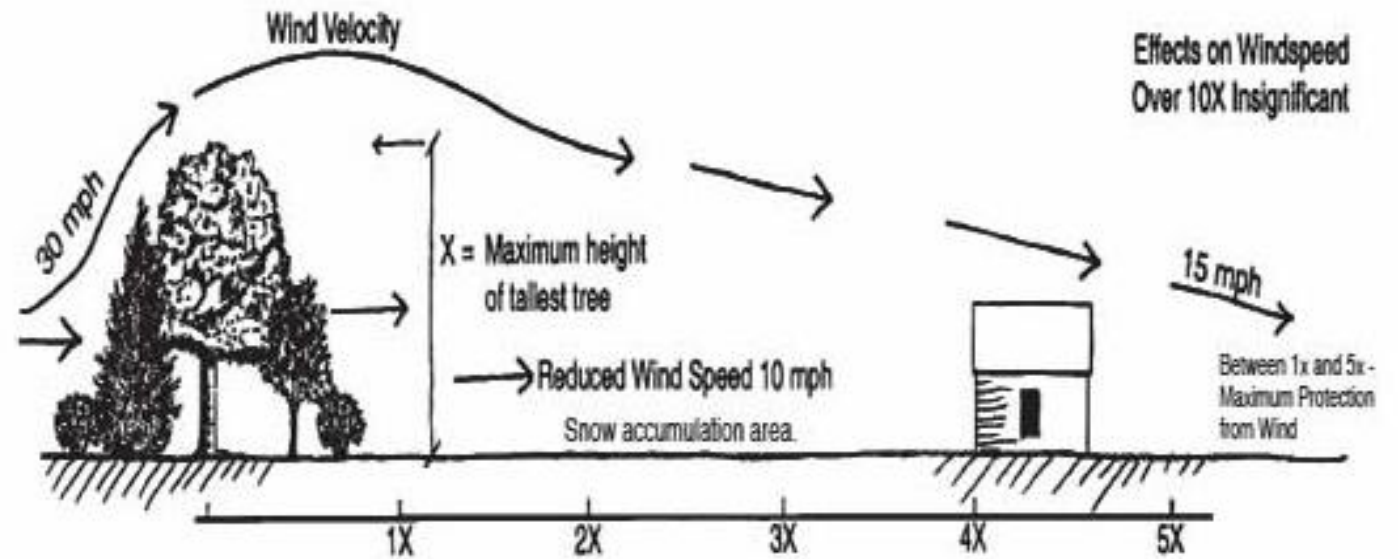
At-home Spreader Examples



Windbreaks

- Permanent or Portable
 - Tree rows
 - Wood fencing
 - Straw bales
 - Slope of land
- Safety:
 - Smooth edges
 - Size of gaps
 - Proximity to feed/water

An Example of the Effects of a Windbreak on Wind Speed.



Windbreak Variations



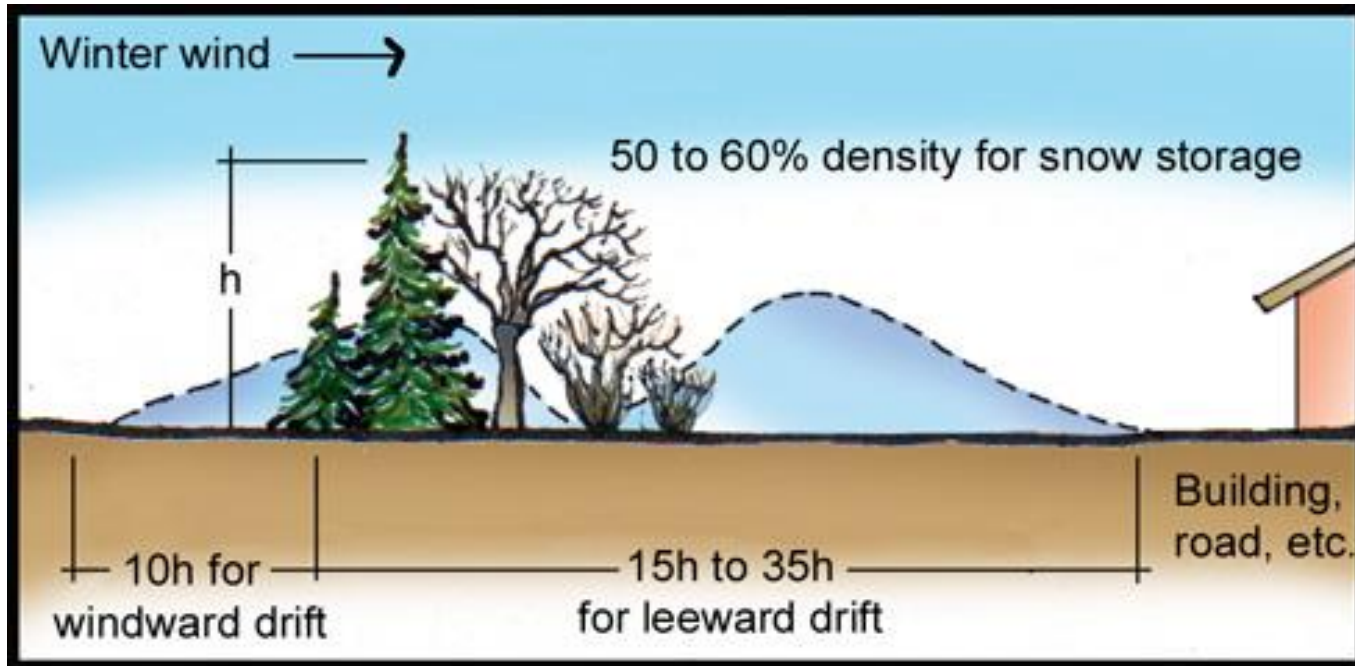
Blanketing

- May be needed if:
 - No shelter available
 - Poor BCS
 - Very old or young
 - Cold and wet conditions
 - Not acclimated to cold climate
 - Body clipped
 - Kept under lights



- Hair coat continues to grow until the winter solstice in December
- Hair coat traps warm air against body
 - Blanketing can flatten hair and decrease insulation effect
 - Need appropriate insulation rating

Snow Drift Physics

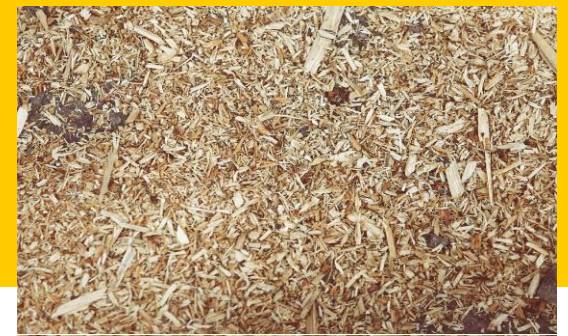


Winter Fence Maintenance



Bedding

- Insulates against frozen ground (12" deep)
- Keeps animal clean
- Common materials in ND
 - Straw (wheat, oat, barley, flax)
 - Wood (chips, shavings, saw dust, pellets)
 - Other (peat moss, newspaper shreds, corn stalk shreds, dried compost, sand)
- Location of use
 - Inside vs. Outside



Waterers

- Check daily
- Heat tape
- Tank Heater
- Protected from prevailing winds



<https://www.nelsonmfg.com/>



Feed Access/Pen Maintenance

- Access to feed, water and shelter
- Keep feed away from the windbreaks to prevent snow from drifting too deep
- Higher location in the pen with close proximity to water
- Snow removal may be necessary for adequate space and safety of the herd
- Regular maintenance will help paddocks drain and dry faster in the spring

Preparing for Winter Storms

- Make sure there is enough forage available
- Safe path to the barn if you need to feed
- Have a generator available with 3 days of fuel to run:
 - Heating systems
 - Water pumps or waterers
 - Lighting

Horse Care

- Snowballs
 - Maintain regular foot care throughout the winter
 - Pick their feet regularly
- Exercising in Cold
 - Use common sense
 - Do not over work
 - Cool them down properly and out of the wind
 - Make sure they aren't hot or wet before turning back out



Photo Credit: Janet Lindquist

Resources

- Composting Animal Manures: A guide to the process and management of animal manure compost
 - <https://www.ag.ndsu.edu/publications/livestock/composting-animal-manures-a-guide-to-the-process-and-management-of-animal-manure-compost>
- 2020 Manure Composting Workshop
 - <https://www.ag.ndsu.edu/lem/2020-manure-composting-workshop>
- NDSU Extension Horse Management Webinars
 - <https://www.ag.ndsu.edu/lem/horse-management-webinars>
 - Manure Management Webinar
 - <https://www.youtube.com/watch?v=Yw0leiyTFFk&feature=youtu.be>
- 8 Step Process for Developing a Horse Manure Management Plan from Michigan State University Extension
 - <https://www.canr.msu.edu/news/an-8-step-process-for-developing-a-horse-manure-management-plan-part-1>
- Horse Care and Management
 - <https://extension.umn.edu/horse/horse-care-and-management>
- Windbreaks for Livestock Operations
 - <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1124&context=natrespapers>
- Livestock Buildings and Facilities After a Severe Winter
 - <https://www.ag.ndsu.edu/winterstorm/winter-storm-information-farm-and-ranch-information1/farm-and-ranch-information-cattle/livestock-buildings-and-facilities-after-a-severe-winter>
- Horse Pastures and Facilities
 - <https://extension.umn.edu/horse/horse-pastures-and-facilities#safety-1242160>
- K2S YouTube Channel
 - <https://www.youtube.com/channel/UCdpmXe6XsvIfcgI2RP6cQcw>