Manure on Equine Operations

What is Manure?

- Anything you feed a horse that the horse does not use
- Micro (S, Fe, Cu, etc.) and macro (NPK) nutrients
- Slow release of nutrients
- Increases organic matter and soil microbes
- Increases crop productivity and yields
- Increases infiltration of water, and water holding capacity
- Most horse farm managers look as manure as a waste product

Manure Storage BMPs

*Very important for the industry

*Survey of 65 PA equine farms - 53% of the farms hauled manure (stockpiled and fresh) off-farm, 27% spread fresh manure and only 7% composted manure

What is Manure Storage?

A location that is regularly used to hold manure before it is utilized on or off the farm

Locating the Perfect Manure Storage Site

- Site at least 100 feet from surface water- ponds, lakes, wet lands, etc.
- Site at least 100 feet from drinking wells, public and private
- Relatively flat area, avoid steep slopes
- Away from flood prone areas
- Away from high water tables

Locating the Perfect Manure Storage Site

- Away from neighbors and property lines – “out of sight out of mind”
- Accessible year round (all weather)
- Far enough away to reduce flies in and around buildings
- Aesthetics

Constructing the Perfect Manure Storage Base

- Improved Base - concrete or crushed stone to limit manure from leaching into ground water
- Slope slightly - liquid draining from the pile drains to the outside and to a vegetative filter
- Loose wet or moist soils should NOT be used as a base - more likely to drain nutrients into soil and ground water

Constructing the Perfect ManureStorage Additional BMPs

- Tarp or permanent roof - prevents saturated manure and pools of seepage
- Gutters are advised to collect and drain storm water away from storage
- Storm water should be diverted around and away from storage area

According to DEP's Manure Management Regulations - storage needs to be covered or stored on an improved base

Calculating Storage Size

Storage size will depend on:

- **Number of horses**
- **Number of days manure will be stored - 6 months is ideal**
- **Type and amount of bedding**
- **Amount of manure being collected**

Calculating Storage Size

- One 1,000 lbs. horse produces ~ 55 lbs. manure daily+ bedding = 730 cubic feet/year of waste per 1,000 lb. animal.

- Local County Conservation District and NRCS should also be able to help engineer the proper size and design.

Manure Options

- **Apply directly to crop fields, pastures**
  - Higher nutrient content
  - Higher risk to water quality
- **Export**
  - Less hassle
  - May cost $$
- **Compost**
  - Reduces odor, weed seeds, pathogens, and parasites
  - Requires more time and labor

Composting Manure

Composting

Natural aerobic processes for stabilizing organic matter

Compost

A soil or humus like material that is no longer decomposing, inoffensive to handle

Benefits of Composting Manure

- Reduces fly population
- Kills parasites, pathogens, and weed seeds
- Reduces odors
- Improves marketability
- Nutrients in a more stable form
  - Slower release
  - Less of a pollution threat
- Reduces volume 25% - 50%

Composting Systems

Windrow System

Bin System

Fencing Options

Purpose of Fencing

- Confinement – keep horses safe
- Controlled grazing
- Group segregation
- Direct movement
- Protect others

"Horses have escaped from and been hurt by every type of available fence".

The "Perfect" Fence

1. Must stand up to a horse's exuberance and instincts to flee and bolt.
2. Horses can hit a fence with great force - fence should contain the horse but have some "give" to minimize injury.

The "Perfect" Fence

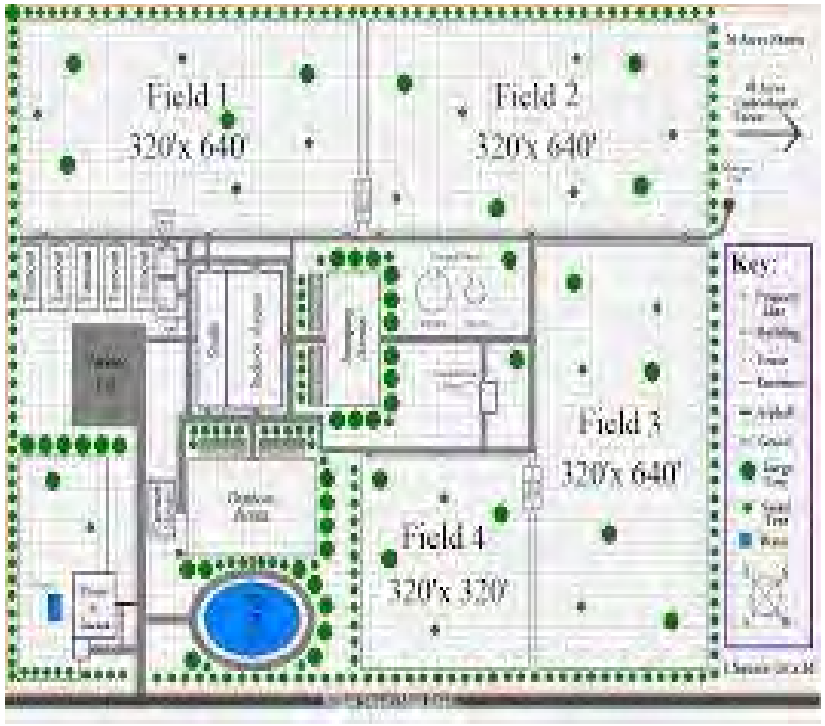
3. A horse will fight more than other livestock if caught in a fence and can cause life-threatening injuries
4. Should be no openings that could trap a leg or head or sharp projections
5. Needs to be high enough to discourage jumping

The "Perfect" Fence

6. Needs to be very visible – Horses are farsighted and look to the horizon for danger
7. Easy to install and maintain
8. Esthetically appealing
9. Inexpensive

Fence Planning - Develop Farm Layout

- Easy access to paddocks (horses and supplies)
- Traffic routes for horses, handlers, vehicles
- Mowing perimeters
- All-weather lanes
- 12 to 18 feet lanes for farm equipment



Fence Planning - Height of Fencing

- Perimeter fencing – at least 54 to 60 inches above ground
- Top of fence should be at wither height
- Stallion paddocks – higher and may be double fenced with lanes between paddocks

Fence Planning

- Boards and wire should be fastened to the inside of the posts
- Should be 8 to 12 inch clearance at the bottom
- Open space between rails - 12 inches or less
- Corners should be rounded

Types of Fencing – Wooden Board

- 3 or 4 board
- Hardwood is best - cut 1” x 6”
- Best = 16 foot boards installed on posts 8 feet on center
- Posts – 7 ½ to 8 foot round or square posts - 4 to 5 inch diameter
- Set in the ground 2 ½ to 3 feet
- Driven posts are more secure

Wooden Board Fencing

Wooden Board Fencing

Advantages

- Safe, strong, visible
- Durable-15 to 20 years
- Aesthetics - can be natural, white washed or painted black with asphalt paint

Disadvantage

- High maintenance
- Horse can chew – especially pine
- Hazards - fractured boards and nails
- Cost

Post and Rail Fence

- **Rails with tapered ends slip into slots in posts; posts are not driven**

Post and Rail Wooden Fence

Advantages

- Aesthetics
- Safer than some other types of fencing
- Can be fairly strong
- 15 to 20 year lifespan

Disadvantages

- If not properly installed rails can slip out of posts
- Posts can not be driven – posts can lean with time
- Expense
- Danger of loose horse

Wire Fencing

- Many types: high tensile, woven wire, electric wire, electric tape.
- May be electric
- Prices and safety vary greatly depending on type
- Low maintenance when properly installed
- Generally 20 to 30 year life span

Woven Wire

- Available in different mesh
- Livestock (square) woven wire fence is 4”x 4” or is smaller mesh at the bottom
- Horse fencing needs to be rectangular woven wire - no larger than 2” by 4” and a minimum of 10 gauge
- Board at top adds strength and visibility

good

not good

Rectangular Woven Wire

Advantages

- Less maintenance than wooden fence
- Lower cost

Disadvantages

- Openings are large enough for a pony or foal's hoof to pass through
- Not as safe or as strong as V-mesh

5-Diamond, V-Mesh Wire

- Posts the same as wooden fence
- Diamond mesh wire installed with top board
- Wire can be installed at ground level or raised 8 – 12” off ground
- Ground level prevents intrusion of other animals

5-Diamond, V- Mesh Wire Fencing

Advantages

- Safest wire for horse fencing
- Close weave prevents horse/foal from catching foot
- Strong due to design w/some flexibility
- 20 to 30 year life span, less maintenance
- Safer than board fence
- Durable - can drive posts, low maintenance

Disadvantages

- More expensive

High-Tensile Wire

- 12.5 gauge smooth wire; high breaking strength of 1,300 to 1,800 lbs.
- Ratchet-type tightners for tension
- Some give – animals will “bounce” off,
- Posts can be as far apart as 60 ft.
- Often 10 to 12 strand – all electrified or every other strand

High Tensile Wire

Hot Cote Wire

High-Tensile Wire

Advantages

- Doesn't break easily
- Low maintenance
- 20 to 30 year lifespan
- Lower cost than wood

Disadvantages

- Low visibility
- Safety, easily can cut horses - causing serious injury

Electric Wire Fence

Description - 3 electrified strands with metal posts and insulators

Advantages

- **Cheap**

Disadvantages

- **Not very strong**
- **Low visibility**
- **Injury on wire and posts**
- **Need to cap post**

Electric Tape Fence

Fiberglass band/strap with electrified center

- **Looks like boards or rope**
- **2 to 3 strands**
- **More visible**
- **Moderate price**
- **Good for cross fencing**

Solid Poly Vinyl Chloride (PVC) Fencing

- Description
- Plastic-like
- Light weight
- Sometimes placed over wood
- Can be solid plank – flat or round
- Different colors
- Look like board fencing

Solid Poly Vinyl Chloride (PVC) Fencing

Advantages

- No painting, will not crack or peel
- Very low maintenance
- 20 to 30 year lifespan
- Very visible

Disadvantages

- Very expensive
- Older fencing splintered when cold

Flexible Poly Vinyl Chloride (PVC) Fencing

Description

- Stretched vinyl bands reinforced with wire
- Different colors

Advantage

- Very safe – horses bounce off
- Very visible
- Low maintenance

Disadvantage

- Price

Barbed wire

Sharp “barbed” wire fence

Cheap, used to fence large areas

Not acceptable for horses – why?

Gates

- Steel tubular, pipe or mesh gates
- 12’ wide minimum horse gate (14’ + wide to accommodate equipment), 4’ wide people gate
- Rounded corners for safety with
- Should be easy to unlatch, open, shut, and properly refasten gate with one hand

Gates

- **Normally hung in middle of fence rather than at corner - horses congregate at gates and prevents trapping in corners.**
- **Metal mesh is better than tubular - horses paw at gates and can get a foot through.**

Useful Life of Fencing Materials

Material	Life (yrs.)	Maintenance
Wood	15-20 +	High
Post and Rail	15-20	Low - Moderate
V-Mesh wire	20-30	Low
Barbless wire	15	Medium
High tensile wire	20-30	Low
Plastic fence	12	Low
PVC	20-30	Low

Summary

When dealing with horse owners…….

- ✓ **Remember they care deeply about their horses and that they are passionate, opinionated, fearful, challenging, and enthusiastic**
- ✓ **Listen to their concerns and goals**
- ✓ **Understand that they may not have an agricultural background**
- ✓ **Take time to understand owners (and their horses) – building trust is important**
- ✓ **Be positive - they may not be as bad as you think**

Conclusion

- ✓ **Most horse owners deeply care about the the well-being of their horses and want to protect the environment.**
- ✓ **Many are looking to us for assistance.**
- ✓ **Care of the horse and the environment can go hand and hand.**

Donna L. Foulk

Extension Educator – Equine Natural Resources

Penn State Cooperative Extension, Northampton County

610-746-1970 or dlf5@psu.edu

Suzette Truax – NRCS Grazing Specialist

Suzette.Truax@pa.usda.gov