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

- 1-2% slope
- Impervious base – concrete, stone, 2ft compacted clay
- Vegetative buffer
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 Manure Storage

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
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 tighteners 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

<table>
<thead>
<tr>
<th>Material</th>
<th>Life (yrs.)</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>15-20 +</td>
<td>High</td>
</tr>
<tr>
<td>Post and Rail</td>
<td>15-20</td>
<td>Low - Moderate</td>
</tr>
<tr>
<td>V-Mesh wire</td>
<td>20-30</td>
<td>Low</td>
</tr>
<tr>
<td>Barbless wire</td>
<td>15</td>
<td>Medium</td>
</tr>
<tr>
<td>High tensile wire</td>
<td>20-30</td>
<td>Low</td>
</tr>
<tr>
<td>Plastic fence</td>
<td>12</td>
<td>Low</td>
</tr>
<tr>
<td>PVC</td>
<td>20-30</td>
<td>Low</td>
</tr>
</tbody>
</table>
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 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.
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