The Accessible Farm Shop

Considerations for Design and Safety

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Outline

- Structure, Windows and Doors
- * Floors, Walls and Ceiling
- Electrical
- Plumbing (water and air)
- Overhead lifting
- Accommodating climates
- Work spaces



Planning

- Ability to safely and efficiently utilize the space is the first priority.
- Ask: "What gives me difficulty when working in the shop?"
 - More difficult to ask "What will give me difficulty..."



Renovate or New?

- Is your current shop adequate in meeting the needs of you and your farm?
- What changes might be made to improve an existing structure?
 - Evaluate current facility and compare "needs" to feasibility (cost).
- If you don't have a farm shop or current shop is not suitable for retrofitting you may consider building new.
 - There is a lot to consider....

Structure

Dimensions

- One of the first questions a contractor will ask when building new
- Equipment size
 - Storage? Maintenance? or Both?
 - Not the same as 20-30 years ago



Height

- Building "up" is often the least expensive gain to shop volume
 - This unlocks potential storage space to add an upper level for inventory storage and placement of remotely accessible tools such as an air-compressor. (freeing up valuable main-floor space)

Length & Width

- Factor of machinery being used
 - width of largest machine, width of un-folded implement, enough depth to fully pull in machinery with implement in tow
- Many shops place the largest doors for machinery in the side wall of the building
- When remodeling it is much more cost effective to add length rather than width to a building.

Windows and Doors

- Many options with doors in windows
 - level of energy efficiency (insulated vs non-insulated)
 - light transmission
 - opening style
 - dimensions
- 1. Machinery door
- 2. Walk-through door
- 3. Windows



Machinery Door Style	Pros	Cons
Sliding Track Door	Least expensive, custom fit to opening, can be equipped with electric opener, no loss in headroom	Heavy/difficult to manually move, no/limited insulation capability, may block other entrances, can be blocked by snow
Side-Hinged Door	Custom fit, can be equipped with electric opener, no loss in headroom	Limited width, large opening swing, hinge strain increases with width, can be blocked by snow
Overhead Door (segmented)	Can be insulated, can be equipped with electric opener, optional windows, available widths up to 40'	May decrease ceiling clearance, obstruct ceiling- mounted lights, and can be expensive
Single & Bifold Hydraulic Door	Large heavy duty, can be insulated, swings outward, creates covered space outside when open, extremely wide widths, no loss in headroom, optional windows	Most expensive

Walk-through Doors

- Most frequently used in shop
 - Accessibility, Energy efficiency and Security
- Recommend:
 - Exterior-rated insulated door with window
 - Deadbolt with programmable key-pad
 - ADA recommends a slope < 1:12, minimum width of 36-inches, level landing area in front of door, lever-style door handle (or remote automatic opener), and maximum threshold height of 1/2 inch





Windows

- Have numerous windows
 - Natural light to work area
 - Increased ventilation (for heat and fume exhaust)
- Energy-Star rated is recommended



Floors

- Typically concrete
- Factors to consider when planning:
 - Thickness
 - Surface texture
 - Surface treatment
 - Maintaining quality
 - Moisture issues (sweating)
 - Drainage (slope)









Walls and Ceiling

- Materials commonly used include:
 - wood (plywood, OSB, pegboard); metal; drywall; or vinyl
- Each material has inherent attributes and may be ideal for various shop types
 - Consider: cost, ease to clean; light reflectance; ease of installation; sound deadening; pest resistance; fire resistance; and durability

Electrical

- Modern shops rely heavily on electrical power
- Consult with a licensed electrician when the time comes to plan the electrical service
- Best to have general idea of needs and wishes to ensure final product works for you
- The three basic components of the electrical system include
 - 1. dedicated circuit components
 - 2. 110 V and 220 V receptacles
 - 3. interior and exterior lighting

Electrical

- Avoid the use of extension cords (trip hazard)
 - Drop down ceiling cords reduce floor hazards
- Receptacles are inexpensive and should be plentiful when building new/remodeling
- High output low wattage lighting technologies increase visibility, safety and security

Compressed Air

- Compressed air is a necessity to most farm shops for inflating tires, cleaning parts/filters, and powering tools
- Considerations for selecting components for the shop include: Tank size; Power supply; Air lines; Air plumbing material; Diameter of plumbing; and Maintenance

Water Supply and Drains

- Necessary for machine maintenance and personal health
 - Considerations include:
 - Freeze-back hydrants / utility tub
 - Burial depth
 - Placement to reduce hose trip hazards
 - Floor slope
 - Drain size and shape
 - Weight capacity (heavy machinery)
 - Ability to be cleaned / catch basket

Overhead Lifting

- Overhead lifting of heavy objects is a frequent occurrence in the farm shop
- Commonly used assistive lifting devices include: Gantry crane; Jib crane; Two/four-post hoist; and Engine hoist
- Mobile machinery may also be used such as forklift of skid-steer

Note: Working below a lifting device that does not utilize interlocks to prevent inadvertent lowering of object can result in injury or death.

Climate (Heating / Cooling)

- Heat flows from warmer to cooler zones until there is no longer a temperature difference
 - Proper insulation will decrease this heat flow
- Benefits to the farm shop will be realized in user comfort, costs of heating/cooling, and maintaining quality of shop contents
 - Shops with insufficient insulation or vapor barrier can lead to condensation (mold, mildew or corrosion of tools or stored materials)

Insulation

- US Department of Energy provides recommendations for "costeffective levels of insulation" based on climate zones.
- R-value rating of insulation indicates thermal resistance of heat flow. (Higher the R-value, the better the insulate quality)

Workspaces

- Placement of workspaces, workbenches, stand-alone tools and storage are critical to the usability of the workspace
- It is key to plan for:
 - Wide margins around all items (> 3') and more around workbenches
 - Tool and workbench height should be a comfortable for the worker (either for sitting or standing). ADA guidelines are a great reference
 - Consider the progression of a project and "group" needed items in adjacent locations. Example: metal stock storage, rough cutting, finer detail tools (mill, drill press), then welding/assembly area

Workspaces

- Mobile tool carts are excellent for commonly used tool storage and to reduce carrying heavy items around the shop
- Organization is key to an efficient workspace. This also greatly assists with vision impairments by having a dedicated location for specific tool identification.
 - Labeling of tools, parts, chemicals assist for easy recognition
 - Trip/slip hazards can be plentiful and every measure should be taken to avoid. Consider: cord/hose reels, plentiful tool and part storage, well drained and/or textured flooring, etc.

Safety and Security

- Always have a way to communicate for help
- Place fire extinguishers near items with increased potential for incident (welding, grinding, torch)
- Have storage space for personal protective equipment
- Identify hazards, store flammable items in cabinet
- Maintain working CO and smoke alarms

Safety and Security

- Air quality
 - have ventilation for painting areas
 - use a dust collector when working
- Security
 - A keyless deadbolt is great for locking shops
 - Large doors can be installed with similar technology
 - Motion lights not only improve security but also help visibility after a long day of work
 - Camera systems are becoming less expensive, consider placing a camera near high value products and tools

Conclusion

- Creating a space that accommodates the demands of the worker(s) is essential to accessibility, safety and efficiency.
- Seek recommendations from neighbors, ATP's, and AgrAbility staff to spark ideas.
- Lastly, your shop should "work" for you.

Thank you

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