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# The Accessible Farm Shop

Considerations for Design and  
Safety

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*Dr. Shawn Ehlers, AgrAbility Technology Outreach  
Coordinator*

*AgrAbility Virtual National Training Workshop  
January 31, 2019  
12:00 p.m. EST*



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# Basic Webinar Instructions

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- ❖ Audio available through computer or phone.
- ❖ Check sound via Communicate menu at top left
- ❖ Closed captions: use arrow to expand or contact the Media Viewer window. You may have to enter some log-in information.
- ❖ Expand/contract any of the windows in the right-hand column with the arrows. May need to do this to see video of presenter.
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# Basic Webinar Instructions

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- ❖ Go to the Chat option in the right-hand column. Please send to “All Panelists”. Enter message in box below TO and hit return. You may enter questions about the presentation at any time.
- ❖ In addition, during the Q & A period, if you have a web microphone, click the “Raise Hand” icon to indicate that you have a question. We will enable your microphone or phone connection.



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# Basic Webinar Instructions

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- ❖ Please let me know if more than one person is viewing at your computer
- ❖ 4 quick survey questions + opportunity to share comments
- ❖ Session recorded and archived with PowerPoint files at [www.agrability.org/Online-Training](http://www.agrability.org/Online-Training)
- ❖ Problems: use chat window or email [jonesp@purdue.edu](mailto:jonesp@purdue.edu)





**AgrAbility:** USDA–sponsored program that assists farmers, ranchers, and other agricultural workers with disabilities.

- ❖ Partners land–grant universities with disability services organizations. Currently 20 state projects
- ❖ National AgrAbility Project: Led by Purdue’s Breaking New Ground Resource Center. Partners include:
  - ❖ Goodwill of the Finger Lakes
  - ❖ APRIL (Association of Programs for Rural Independent Living)
  - ❖ Colorado State University
  - ❖ Washington State University
- ❖ More information available at [www.agrability.org](http://www.agrability.org)



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# The Accessible Farm Shop

Considerations for Design and  
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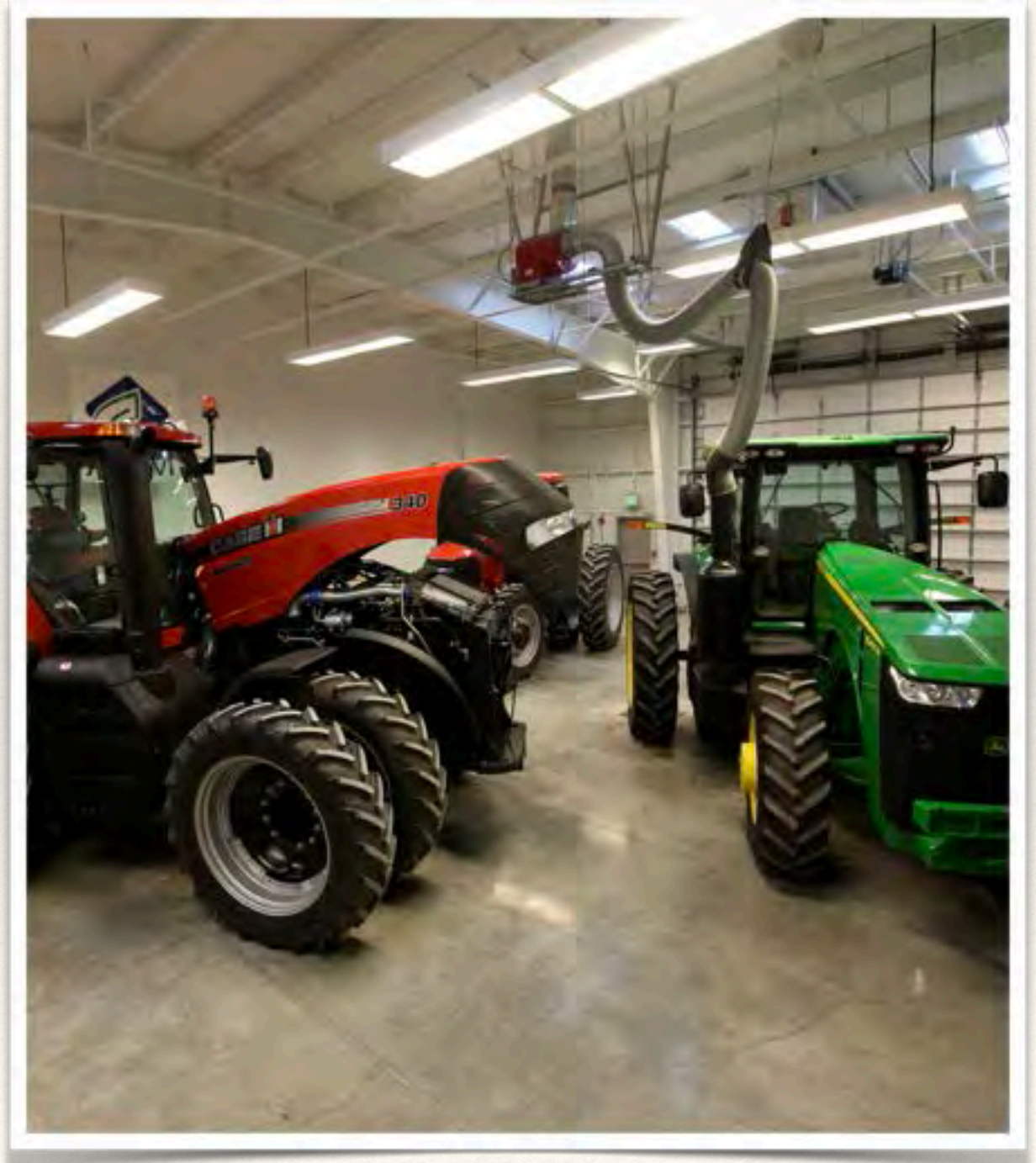
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# Outline

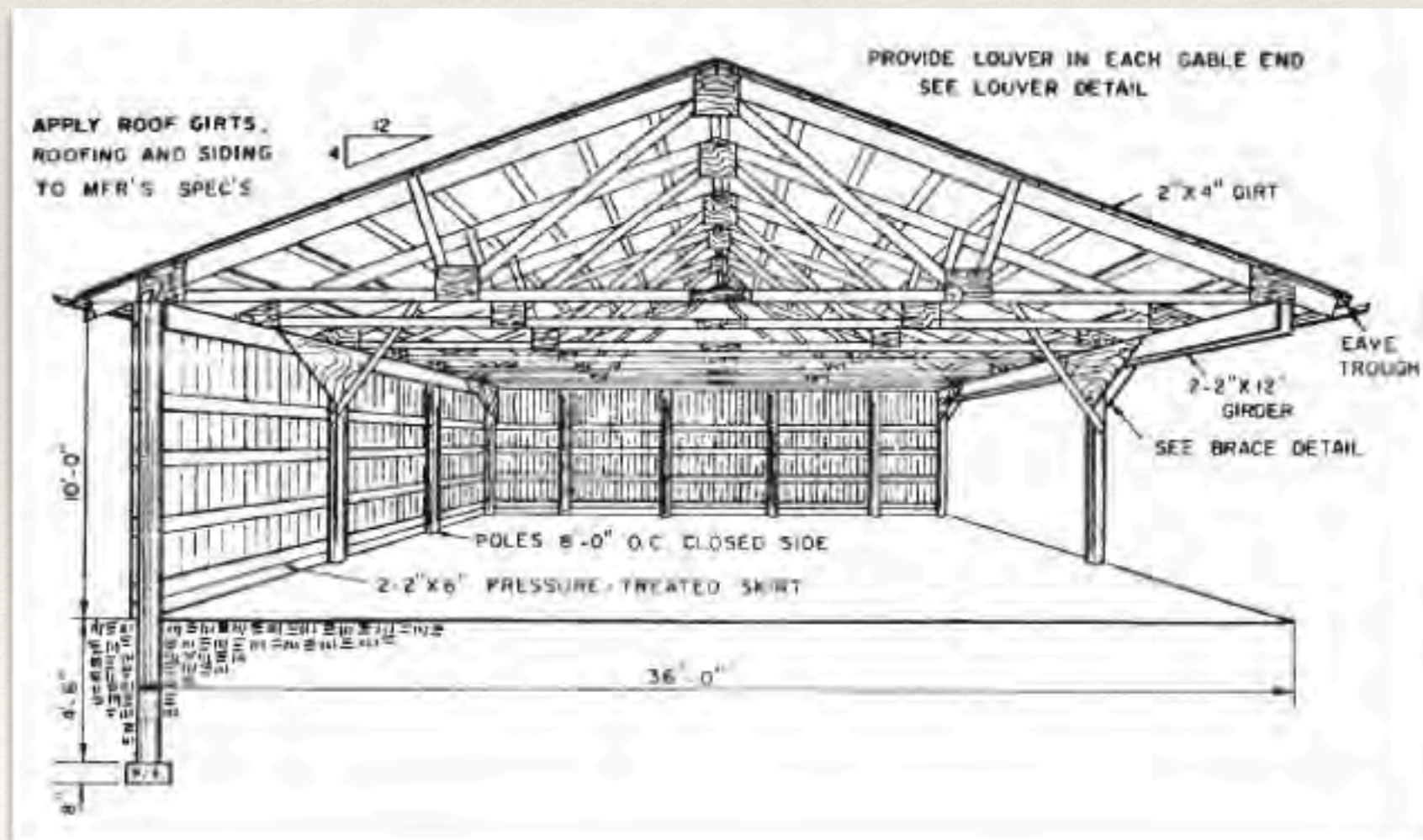
- ❖ Structure, Windows and Doors
- ❖ Floors, Walls and Ceiling
- ❖ Electrical
- ❖ Plumbing (water and air)
- ❖ Overhead lifting
- ❖ Accommodating climates
- ❖ Work spaces





# 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...”





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# Renovate or New?

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- ❖ 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....



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# Structure

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- ❖ 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





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# Height

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- ❖ 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)



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# Length & Width

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- ❖ 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 and 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
<i>Sliding Track Door</i>	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
<i>Side-Hinged Door</i>	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
<i>Overhead Door (segmented)</i>	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
<i>Single &amp; Bifold Hydraulic Door</i>	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

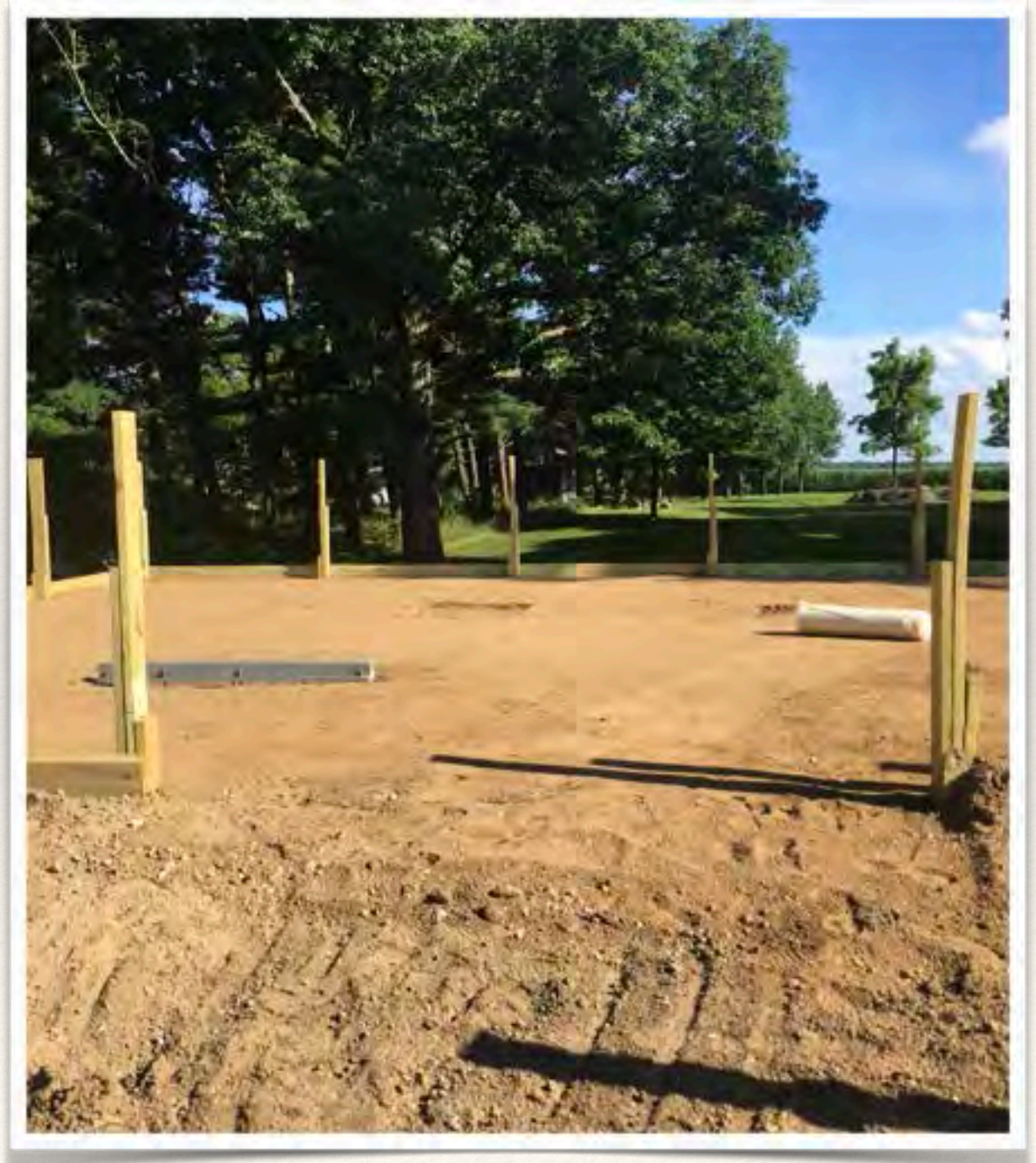
- ❖ Have numerous windows
  - ❖ Natural light to work area
  - ❖ Increased ventilation (for heat and fume exhaust)
- ❖ Energy-Star rated is recommended





# 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

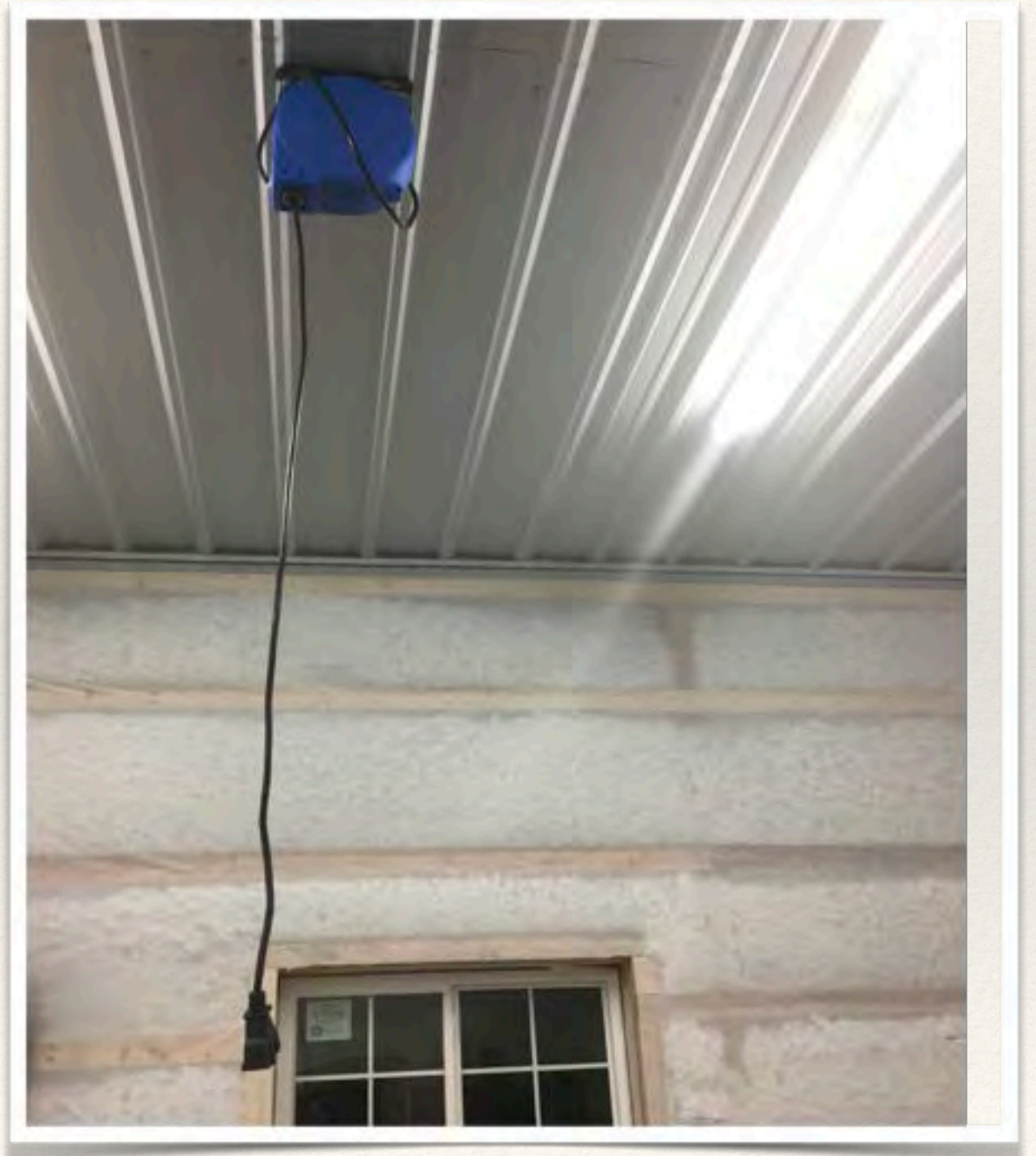
- ❖ Modern shops rely heavily on electrical power
- ❖ Consult with a licensed electrician when the time comes to plan the electrical service
- ❖ Best to have general idea of needs and wishes to ensure final product works for you
- ❖ The three basic components of the electrical system include
  1. dedicated 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







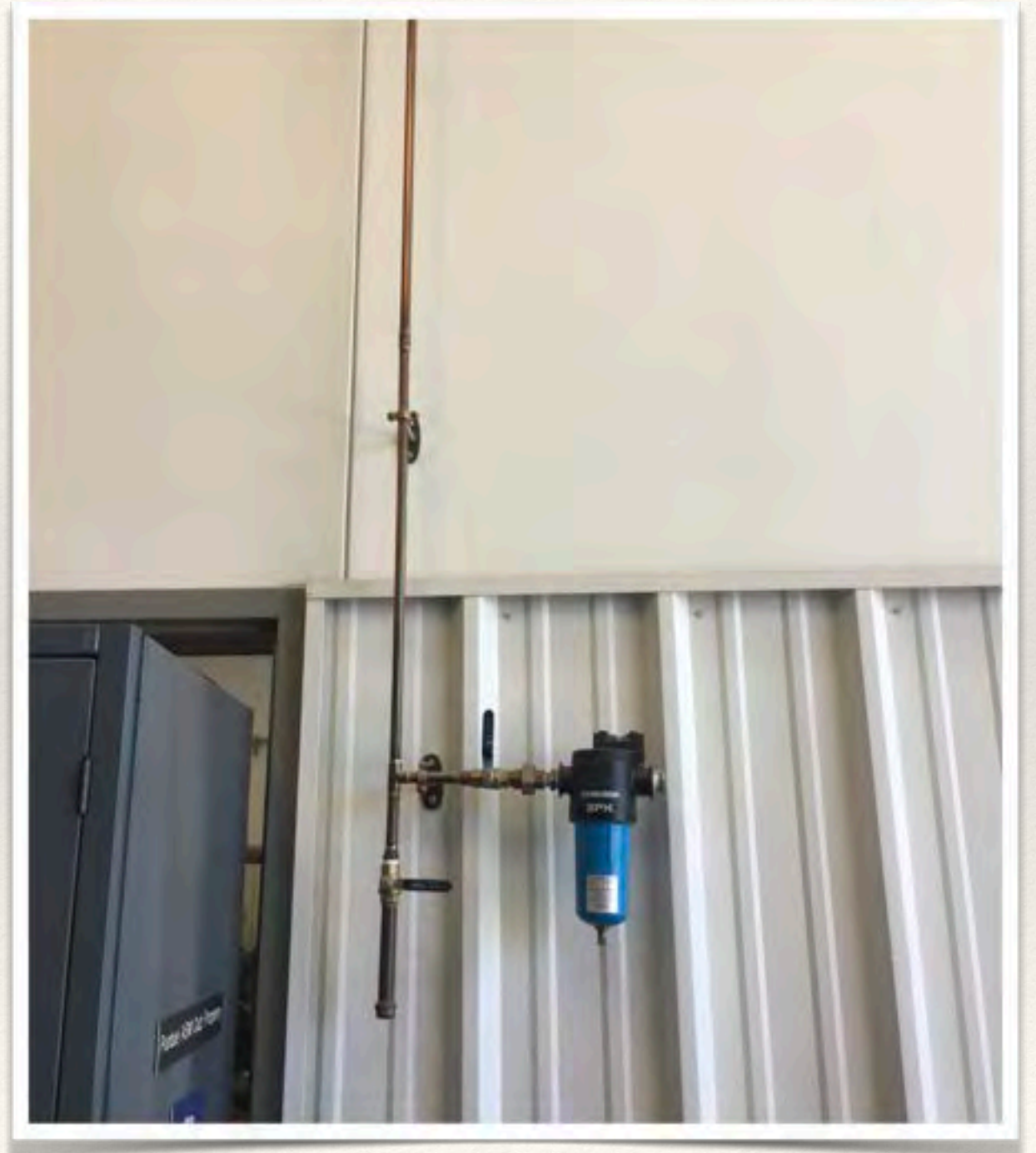






# Compressed Air

- ❖ 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





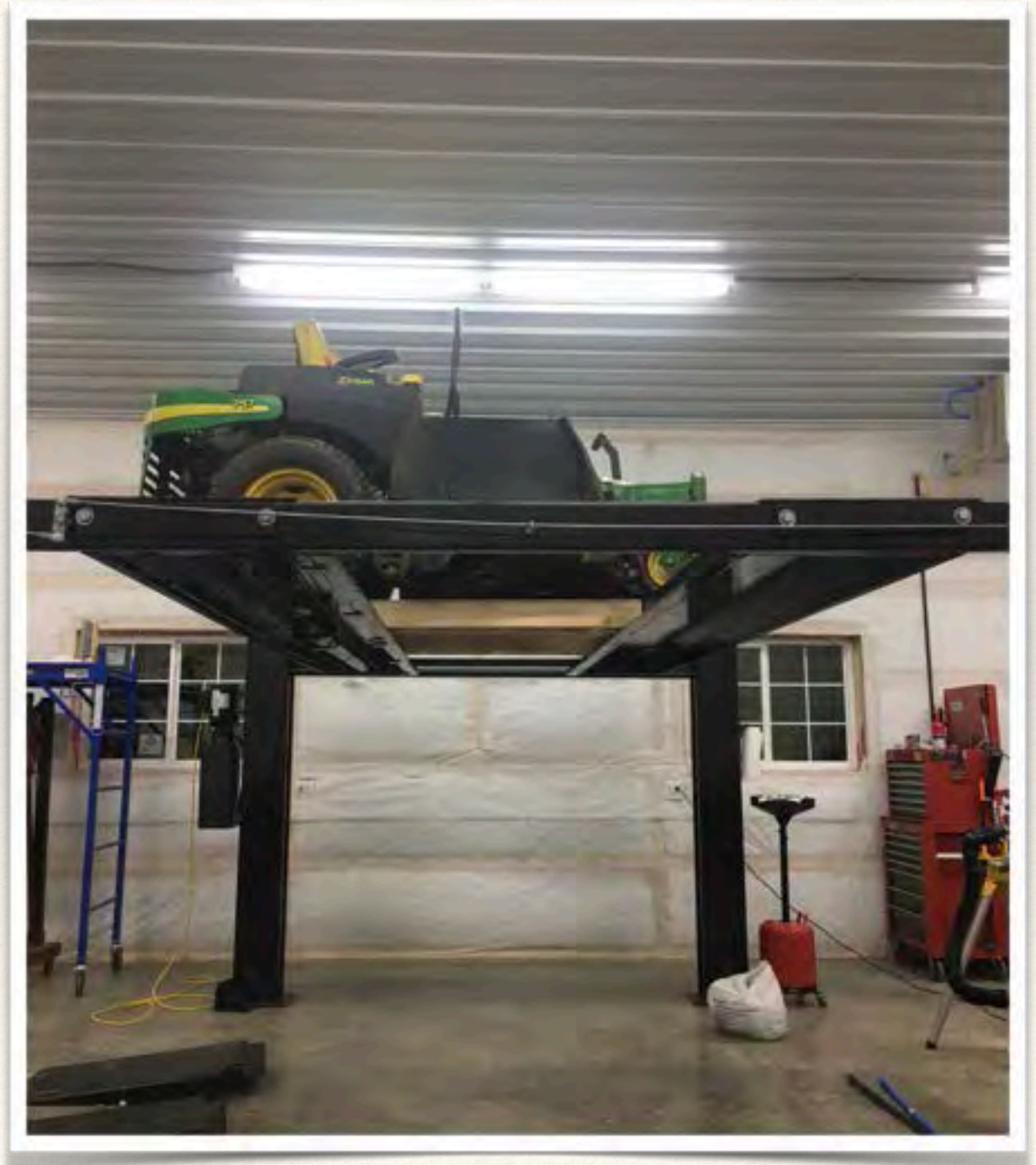




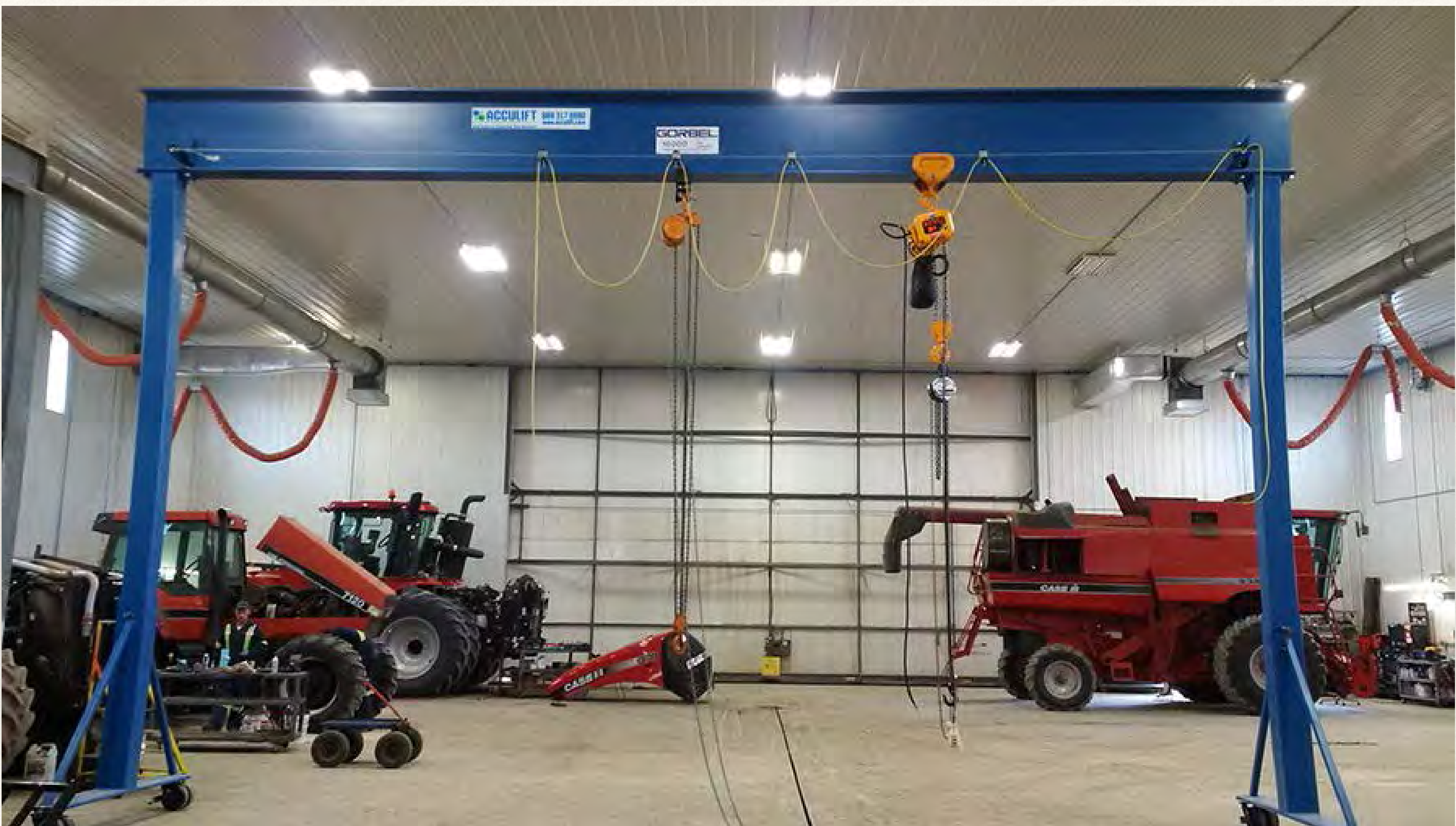
# Overhead Lifting

- ❖ 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 or 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.









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# Climate (Heating / Cooling)

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- ❖ 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)

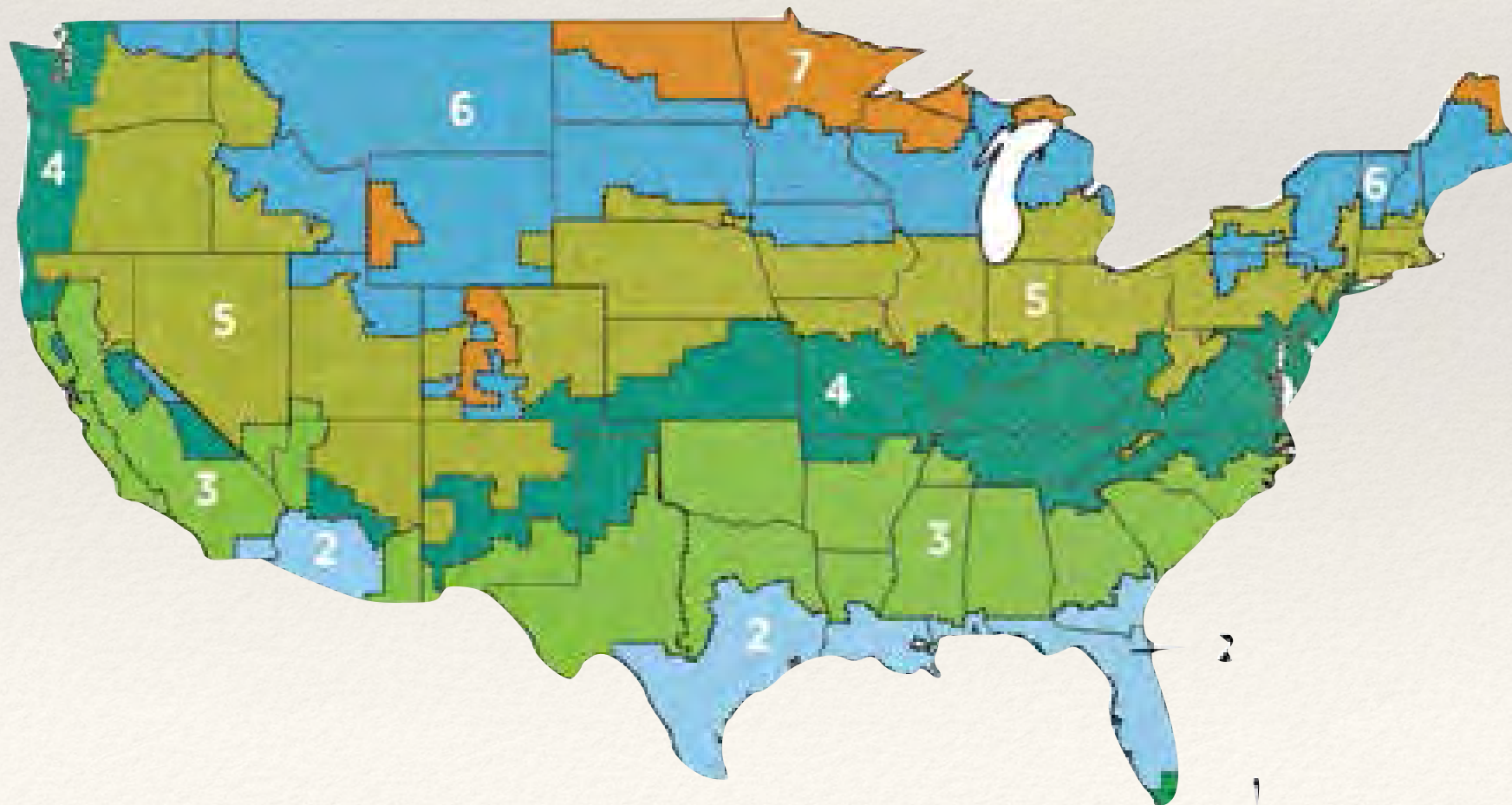






# Insulation

- ❖ US Department of Energy provides recommendations for “cost-effective 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)









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# Workspaces

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- ❖ 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 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



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# Workspaces

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- ❖ 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.





















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# Safety and Security

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- ❖ 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



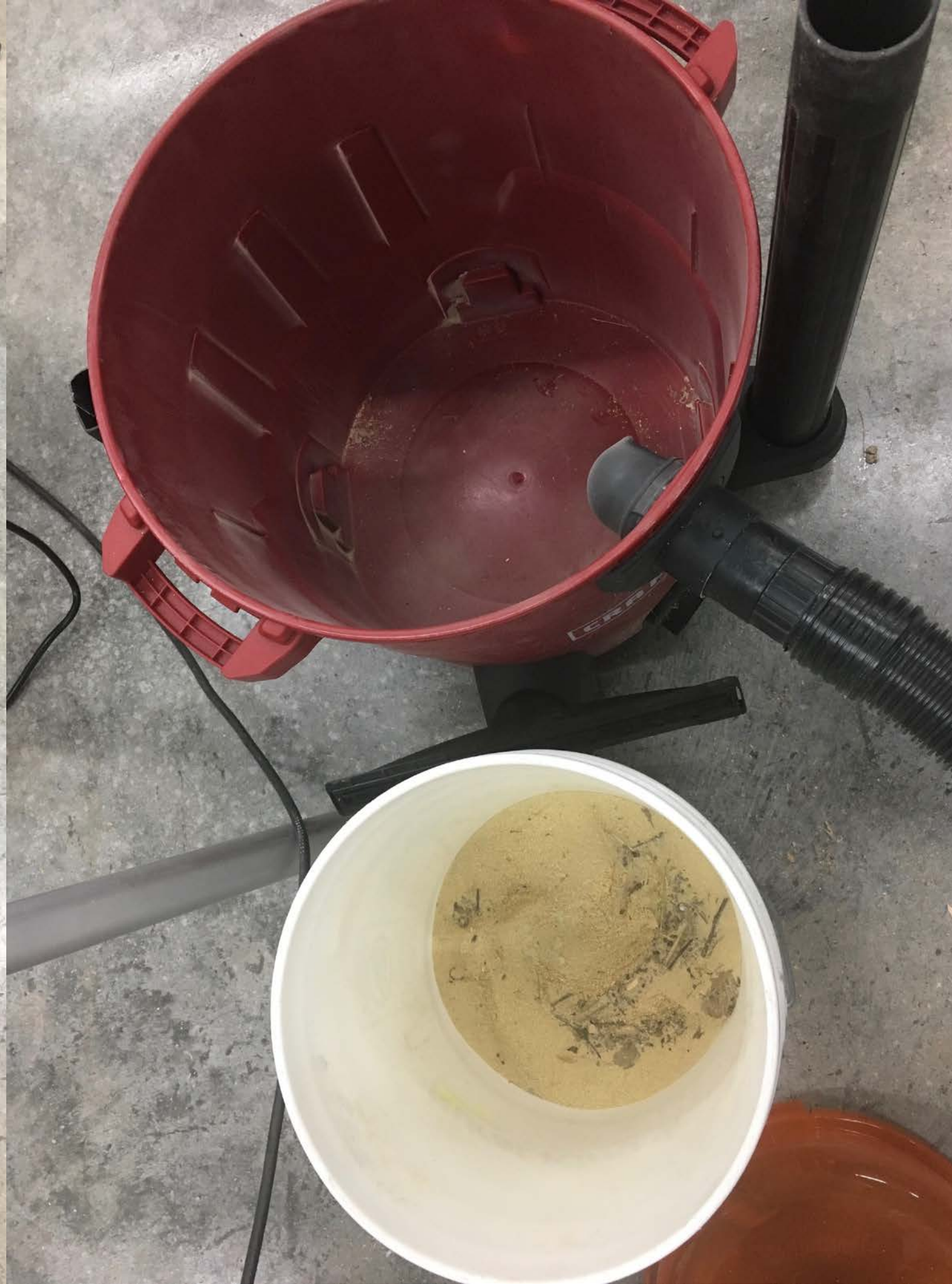
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# Safety and Security

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- ❖ 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











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# Conclusion

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- ❖ 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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