

Efficient Farm Shop Tips

Build for your current and future needs



A Special Report
Offered By Farm Progress

 **FarmProgress**
Agriculture's Information Leader™

Contents

Every job has its place.....	3
Decide which door size fits your needs.....	4
Save on heat and energy.....	4
Provide adequate electrical capacity.....	5
Improve acoustics in your farm shop	6
Benefit by using energy-efficient materials	6
Secure your farm shop from unwanted intruders.....	6

Tips and Tricks For Farm Shop Efficiency

As farm machinery gets larger and more expensive, farmers need to expand their farm shops. Some want to remodel, some want to build new.

Maybe you're building a shop because you've always wanted one and decided now is the best time. As one farmwife told her husband who couldn't decide whether to invest in a shop that produced zero immediate net return, "Go ahead and build it. It is a long-term investment. If you are going to build it, do it now while you are younger and can work in comfortable conditions from here on out."

Farm equipment has outgrown many farm shops. Most farmers service their equipment themselves and many do what repairs they can. It pays to have a decent place to work on machinery.

Also consider the cost of machinery you want to protect and maintain. Modern farm shops are big enough to provide room for almost every kind of project imaginable. Wash bays, tire changers, welding spots, adequate electrical outlets and lighting – even the type of door is crucial when designing and building a farm shop.

If your plans for the farmstead include updating the farm shop or expanding an existing structure, consider the following guidelines for optimal efficiency.

Every Job Has Its Place

The ideal shop has various areas for differing tasks. One corner is for welding. Another corner is where the tool cabinets reside. Equipment is on wheels so it can be moved quickly wherever it is needed.

A workbench made of 1/4 inch steel, or other desired material, could line one side of the shop. Ensure the bench provides enough room for multiple persons to work, or to accommodate your largest projects. This area is particularly useful when paired with special fluorescent task lighting.

Electric outlets and compressed air outlets could be set up at intervals along the workbench so an outlet is always easily accessible and cords are not cluttering the work area.

Steel shelves make an ideal storage option for equipment parts and other necessities. A tire changer is good to have on hand, placed in a corner somewhere out of the way. Chain horses on wheels allows them to be mobile and used where needed.

Have a place for a time clock and owner manuals for easy access. Be sure to have a table somewhere to work and eat lunch or for break time and talking shop. This area could be near a unisex bathroom or set of bathrooms, and a personal office for you or your employees.

When designing this area, remember that office layout, lighting and décor is linked to performance. For example, workers in windowed offices were shown to spend 15% more time staying on task than colleagues in windowless offices.

If you have several employees – even family members – you may consider creating a quiet space off of the main shop for a conference table and several chairs. This area could help separate business and family time, and offer a comfortable, easily accessible location to meet with your suppliers, seedsmen or landowners.

Another nice feature, if you have the space and money, is a separate room to clean equipment.

The wash area should be tall enough and large enough to allow in most machinery. It needs to have an ample drain, and adequate separation from other areas of the shop. This makes it convenient to wash equipment before taking it on to storage, or before taking it into another part of the shop for repairs.

A wash room is not something every shop has, but when you have a chance to start from scratch, you can add extra features at less cost than if you are updating an existing shop.

One farmer who isn't ready to finish his building as a shop, but who may want it to be a shop someday, left two small square areas where he could install water. Due to his building design, it would be simple to run water lines to those two spots and install water later if needed.

Decide Door Size That Fits Your Needs

Some people worry about door height, wanting to get large equipment like combines into the shop. Others worry about width. One farmer is building a 40-foot wide door because he wants to bring equipment of that width, such as an implement not folded, into the shop. Others intend to get the tool in, then fold it out.

If you're modifying an existing building, large doors for equipment should be located on the south or east side of the farm shop, to conserve heat. It's best to avoid prevailing winter winds from the north and west.

Windows should also be installed primarily on the south side of the building to capture sunlight during the winter and allow minimal solar gain in the summer. For optimal efficiency, windows in walls and overhead doors should be double-glazed.

Save Heat, Energy In Farm Shop

Many prefer in-floor heat, but it may not be for everyone. Will there be corrosive materials used in the building that could affect life of the system or of the boiler unit? Will the system be set up in sections so that if a leak develops someday, you can only address that one section and not put the whole system and floor in jeopardy?

For example, Todd Intermill, a Colman, S.D., farmer, has a 36-by-56-foot shop that is totally climate-controlled. The air temperature stays at 55 degrees F in the winter and 72 degrees F in the summer. The humidity never gets above 50%.

Intermill heats, air-conditions and dehumidifies the shop with an air-source heat pump and a backup electric furnace. He spends about \$650 a year on utilities.

The key to the system is the air-source heat pump, an appliance that works like a refrigerator, but can also work in reverse and serve as a furnace. It transfers the heat from the outside air to the inside air, even when the air outside is colder than the air inside.

Passive solar energy helps heat the shop, too, and a small electric furnace provides auxiliary heat on the coldest winter days. The combination "is more efficient and a lot more comfortable than in-floor heat," Intermill says.

The size of a shop heating system depends on the size of the shop, how often it's used, and how often large doors will be opened and closed. Forced-air furnaces, infrared heaters and in-floor heating systems are commonly used. Typical heating fuels include propane, wood, fuel oil or waste oil.

Managing forced-air heaters for energy efficiency can be difficult. Furnaces should be sized at approximately 50 BTU per hour per square foot of shop floor area. Ceiling-mounted, forced-air space heaters prevent hot air from stagnating near the ceiling.

Power-vented or condensing heaters are more energy efficient than natural draft heaters. A power-vented heater and a condensing heater are approximately 13% and 25% more efficient, respectively, than a natural draft heater. Unvented liquid propane or LP heaters commonly used in livestock buildings are not recommended for farm shops due to the lack of ventilation and the danger of carbon monoxide poisoning.

In-floor heating systems are best suited for shops that are frequently used during cold weather. Floors retain heat for long periods and provide a comfortable working surface. However, these systems are relatively expensive and not ideally suited for occasional use.

To conserve heat during winter, minimum recommended insulation levels around the shop include an R-value of 10 for shop doors, 15 to 20 in sidewalls, and 30 in ceilings. To protect insulation from moisture, a vapor barrier of 6-mil polyethylene should be installed between the inside wall or ceiling panel and the insulation.

Provide Adequate Electrical Capacity

Providing adequate electrical capacity for both current use and future growth is important from both a functional and safety perspective. It is recommended to install at least a 200-amp, 240-volt service to the building. Locate the service entrance panel near a walk door for emergency shut-off access, and plan for expansion with enough branch circuits with generous wire sizes to avoid the expense of rewiring in the future.

Follow These Basic Guidelines For Electrical Outlets:

- Install one 20-amp duplex outlet for each four feet of workbench, and put it under the front edge to keep cords off the bench.
- Use an outlet to serve each permanent motor-driven tool that is one-half HP or less.
- Locate outlets at 10-foot intervals around the shop's perimeter, four feet above the floor.
- Install ground-fault circuit interrupters on all circuits where tools might be operated in damp locations, and on any outside outlets.
- Individual branch circuits must be used for outlets serving motors larger than one-half HP. Plan for one circuit to serve no more than three one-third HP motors, two one-half HP motors, or one 1 HP motor or larger.
- Use at least a 50-amp, 240-volt, 2-wire with ground circuit and outlet for a welder. Locate it just inside the door, or add a second weatherproof outlet on an outdoor yard pole, so larger machinery can be repaired outside.

General Tips For Choosing Shop Lighting:

- For general indoor lighting, provide at least 20 foot-candles of illumination at floor level. That's equivalent to one double-tube, 4-foot fluorescent fixture for every 80-100 square feet of floor area, assuming an 8-foot mounting height. Light-colored ceilings and upper walls help.
- For task lighting, use double-tube, 4-foot fluorescent fixtures mounted about 4 feet above the workbench and positioned toward the front half.
- Use incandescent lamps over rotating tools like grinding wheels to avoid the strobe effect.
- For general outdoor lighting, use 200-400 watt high-pressure sodium or metal halide lamps, mounted at a 15-25 foot height, with photocell control. Space lights no more than 125 feet apart for best lighting

conditions. Place a 150-watt spotlight, with motion sensor activation, on one or both sides of the entrance door instead of over the door, to keep out flying insects.

Improve Acoustics in Your Farm Shop

Noise level may not be the first thing you think of when it comes to making sure you have the perfect farm shop working environment, but having the right sound deadening components installed in your shop could be the difference between a quieter, more controlled environment and an endless amount of echoes.

Install special panels or foam to cut down on noise in shops and storage sheds. Protecting your hearing is important while working around machinery and tools.

Benefit By Using Energy-efficient Materials

Check with your local utility providers for potential rebates on insulation, lighting and heating systems for the farm shop.

Consider energy-efficient lighting, such as T5 or T8 fluorescent fixtures for bench lighting, LEDs for task lighting, or high-intensity discharge lamps such as metal halide for ceilings.

An energy-efficient machinery maintenance shop is a necessity on the modern farm. A well-planned, well-equipped shop encourages a farmer to practice on-going preventive maintenance on his equipment, which extends its useful life and also reduces the chances of costly downtime during field operations.

Secure Your Shop From Intruders

The high price of scrap metal and copper likely is the reason thefts of farm equipment and tools are increasing. Thieves seem to be looking for any kind of a small mechanical device, such as an air compressor, generator or welder, which they can take and quickly sell. With many farmers also balancing off-farm jobs too, equipment can be stolen while they're away, sometimes in the middle of the day.

Tips for adding security to your new farm shop:

- Post a simple, cost-effective "No Trespassing" sign.
- Install sturdy locks for man doors, sliding doors, and windows. If you are interested in electronic systems, several companies offer automated doors and locking mechanisms that take the guess work out of security. Never again ask yourself, "Did I lock that?"
- Coded locks are an ideal option to provide individual access to cabinets or doors for employees or other personnel. Electronic locks can avoid lost key situations or key duplication, and can be changed easily and often.
- Never leave or hide keys to equipment or buildings on or near them, as thieves may easily find them. Consider installing a locked key cabinet to house keys for implements and other items when not in use.
- Add lockable cabinets or filing areas for sensitive farm information, if you are including an office area. Even a fire-proof safe for important documents or other valuables is a consideration.
- Use lockable fuel caps on machinery, and lock bulk fuel tanks.
- Ensure there is minimal vegetation – which can provide ideal hiding spots – surrounding your new farm shop or building.

- Purchasing security cameras or alarm systems, for both outdoors and in, may deter thieves. Even simple motion-activated lighting to supplement traditional photocell outdoor lighting systems can prevent theft. Check with your insurance agent regarding coverage discounts, if opting to add a security system.
- If your new building is situated on a separate driveway, consider adding a driveway enunciator – a cable "doorbell" of sorts – that stretches across the driveway to alert persons inside the house or shed that someone has entered the property.
- Upon completion of your new workspace, take inventory, including photos and video, descriptions and any identifying numbers, of all tools and equipment.