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Planning Considerations for the Construction of a New Swine Building: Pork Industry Handbook

Michigan State University Extension Service

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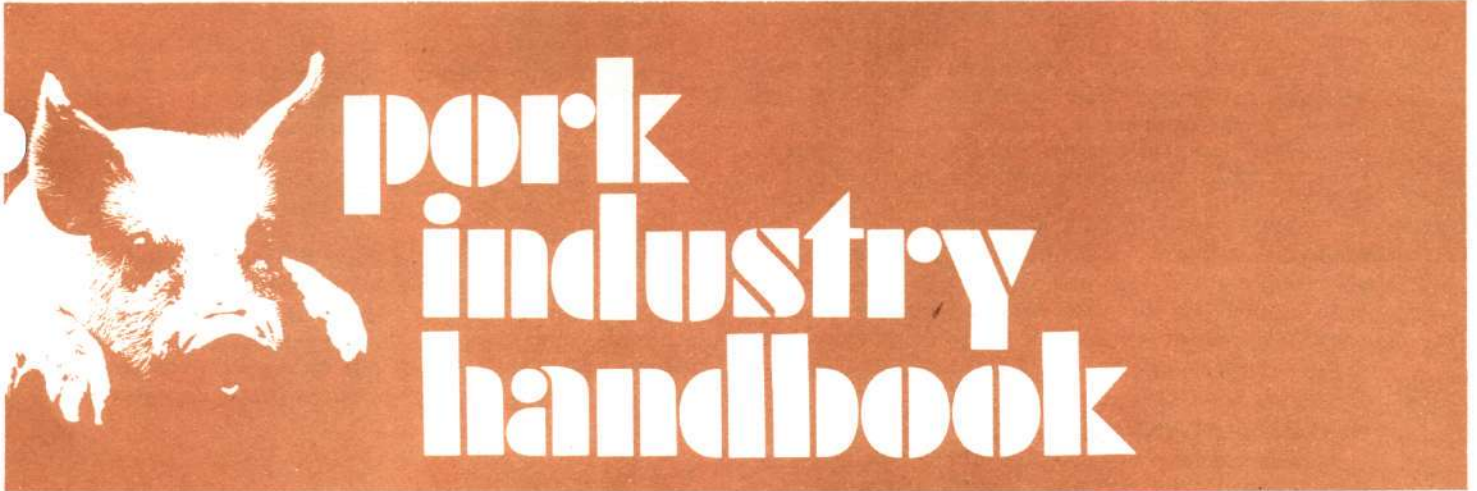
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Planning Considerations for the Construction Of a New Swine Building

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When you decide to buy a new car, you do not start thinking, "I can buy some tires at a good price from the co-op tire dealer in the next town; the local auto dealer has a good price on engines; and I remember seeing an ad for a new type of car seat in last week's paper." You don't call up the local auto mechanic telling him you need a new car and ask him how much it will cost to build one and when he can have it ready.

Yet the majority of swine buildings — whether building new or doing major remodeling — are designed piecemeal by the farmer, a feed salesman, an equipment supplier, a local building contractor, or local veterinarian. The costs of these buildings can be many times the cost of a new car. Most painful is the realization that the piecemeal approach to designing and building swine buildings often costs more in the long run than a well planned and engineered building.

This fact sheet lists a number of points that should be considered when planning and managing the construction of a new swine building. More detailed information on these topics is in the Midwest Plan Service Swine Housing and Equipment Handbook (MWPS-8).

SITE SELECTION

Proper choice of a site for your new swine unit will not in itself ensure a successful operation. However, if you choose a poor location, you will be saddled with serious problems for a long time.

Locate downwind (of summer winds) from any residences to minimize odor problems. When possible, choose a location with protection from cold winter winds and snow accumulations. Naturally ventilated buildings

need an open area to allow adequate natural air movement. Allow a minimum of 50 feet between buildings. A larger spacing would be better for fire control. The Reinsurance Association of Minnesota recommends a spacing of 100 ft. for fire control.

All-weather roads are essential to move feed and hogs. Locate near an adequate electric supply. Many power companies charge for running new electric lines to your new buildings. If a high electricity demand is expected, check for 3-phase power. Water should be of drinking quality. Your source should be able to supply the daily requirements plus other demands such as spillage, cooling sprays, cleaning, fire protection, and expansion.

Provide access to all sides of new and existing buildings. The fire department must have room to move its equipment close to any fire source. Enclosed walkways should not block access to adjacent buildings, and should be designed and managed to prevent the spread of fire. Provide a path for vehicle passage around or through any walkways.

Locate new facilities adjacent to existing buildings or extensively remodel existing facilities only if these existing facilities are located properly, are in good condition, and fit your plans. Frequently, producers lock themselves into a location because of an existing building and it often is in a poor location or is otherwise unsuitable.

Surface and subsurface drainage is necessary for all buildings. Do not locate in a low area that can result in wet conditions in and around the buildings. Use adequate gravel fill under the floor to ensure good drainage and help prevent cracking of the concrete.

Check out local zoning and environmental laws and regulations for a proposed location. If the location is

zoned for other than agriculture, check with legal council before building. Locate your hog production unit away from the residence, away from the water well and back from major highways. Isolation is an economic concern that merits serious attention when locating a new unit. In a hog-dense location, consider an electrical security fence to prevent stray animals from coming in contact with your unit.

When purchasing a farm or establishing a new swine production unit, a location with easy access to a point of marketing can be an important factor. Also, make sure a new location has adequate land for manure disposal. Develop a plan for how and where you could expand the facilities in the future.

BUILDING PLANNING

You should have a complete set of plans and specifications prepared before beginning construction on any new or major remodeling project. Detailed plans, specifications, and contracts help provide the needed communication and understanding between owner and builder so that you get what you want. A complete set of plans should include the following:

- Floor Plan and Cross Section
- Foundation Plan
- Ventilation Plan
- Electrical and Lighting Plan
- Structural Details
- Water System
- Waste Management System
- Feed Handling System
- Flooring and General Equipment Specifications
- Building Material Specifications
- Fire Protection Planning
- Animal Handling Facilities

ENGINEERING HELP AVAILABLE

Cooperative Extension Service

Most counties have an agricultural Extension agent who can provide planning material including general plans. These Extension agents can also call in Extension specialists from your land grant university. Extension personnel can help with general recommended information on system planning, building materials, ventilation and waste management systems. They are not able to prepare detailed construction plans for you and your builder.

Soil Conservation Service

Each county has a district conservationist who is able to help with drainage and some waste management problems. They also have area and state engineers to back them up with additional engineering help when necessary.

Equipment Dealers

Equipment dealers have seen many different operations and may offer suggestions as to what works best. Equipment dealers can be helpful in planning how their equipment should be installed and used in your operation. Some equipment companies have engineering help to adapt their equipment to your needs. It is the first goal of the dealer to sell equipment, so remain objective and carefully choose the type and amount of equipment that best suits your needs. An unbiased, experienced planner is best.

Building Company

Building companies that specialize in swine facilities can be a help in planning your operation. Their experiences with the construction of similar facilities can be helpful in planning what will work the best. They usually also have a number of contacts with equipment dealers who they have worked with in the past. Recognize, though, that most builders are not engineers and may not have an engineer on their staff.

Choose a building contractor who will consider all your needs. Be wary of company representatives who provide a "cheap" building but furnish inadequate assistance concerning long range planning for expansion, best use of existing space and facilities, and total system evaluation including manure handling, animal flow and management input.

Consulting Engineer

With the intensified building systems being used today, a consulting engineer can contribute an important service to producers. Industries would not think of constructing a new plant or office building without first hiring an engineer to plan and supervise construction, yet many large swine operations of equal or higher cost are built with very little engineering help.

A consulting engineer can make a major contribution by evaluating the many options for livestock equipment and the multitude of concepts concerning waste management, building structures, and ventilation systems. These items should be adapted and tailored to the management skills, abilities, and present needs of the producer. An engineer can make sure that the building is structurally sound and that all the different systems within a building work together without one interfering with the other.

Consulting engineers usually complete a project in three phases: preliminary planning, engineering design, and construction monitoring. They may be retained to help with one or more of these phases. Select a consulting engineer based upon the following factors:

Registration.

Practicing consulting engineers must be registered professional engineers in their state of residence and qualified to obtain registration in other states where their services are required.

Technical qualifications.

Reputation with previous clients.

Experience on similar projects.

Availability for the project.

Consulting engineers can provide the following services:

- Personal consultation—providing technical advice or evaluation of proposed plans and designs.
- Planning studies—evaluation of future expansion goals and animal flow together with existing facilities.
- Feasibility studies—including economic comparisons of preliminary plans and alternatives.
- Approvals and permits—assisting with procurement of regulatory approvals or permits.
- Design—including preliminary and complete construction details.
- Specifications and bid documents—preparing for equipment, structure and services.
- Cost estimations—estimating for proposed facilities and equipment.

- Construction services—monitoring construction, advising on building acceptance.

Be sure to enter a contract with the consulting engineer to establish what duties are expected of the engineer.

TOTAL PROJECT COST

The lowest total project cost or lowest individual component price should not always be the only determining factor for the selection of the component or total project. Too many existing agricultural buildings have been selected on that basis and exhibit poor design, short service life, inadequate flexibility and overall poor performance. The total project cost and component pricing must be within budget guidelines, but the key selection criteria should include proper design, quality materials, and adaptation to management goals.

CHOOSING A BUILDER OR CONTRACTOR

The two major tasks involved in the successful completion of a new building is developing a good building plan and selecting a good contractor to build it. When looking for a builder or contractor, consider the following:

Check with friends and neighbors who have had construction done recently. They will have recommendations that you should consider. Also check with your county Extension agent.

Check local advertising media such as newspapers, telephone yellow pages, and local radio stations.

Look in farm magazines for both local builders and regionally based companies that do business in your area.

Ask for references. Any good builder or contractor will be happy to provide potential customers with a list of references and previous customers. Check thoroughly with a number of references concerning workmanship, timeliness and completion of contract items.

Another place to check is with your lending agency for their evaluation of contractors you are considering.

Ask for competitive bidding. A comprehensive design and specification package can be used in conjunction with good contract and bid documents to select the most competitive from the available qualified builders.

PREPARING A CONTRACT

A contract is an agreement between the builder and the owner. To promote better understanding and reduce problems, a contract should be prepared with all items discussed and agreed upon in writing. Points that should be covered in the contract are:

Bid Alternatives. In some cases it may be desirable to have bids on portions of the construction as well as the entire project. When funds are limited, a farmer may want the option of using his own labor to do site preparation or equipment installation work to keep costs down. Alternative bids provide a basis for selecting those jobs that can save the most money.

Duties of the Contractor. On most projects the contractor supplies all labor, equipment, and materials to complete the structure.

Duties of the Owner. If any of the work, equipment or materials is to be supplied by the farmer, it should be specified. Usual inclusions are providing electrical power, telephone service, restroom facilities and water required during construction. The owner or his representative also should be available at specified times for consultation or interpretation of plans and specifications.

Drawings and Specifications. No building should be constructed without a complete set of scaled drawings and written specifications. These may be supplied by either the owner or the contractor and should be included as part of the written contract.

Provide Owner Shop Drawings for Fabricated Equipment. Many swine buildings contain equipment that is designed and built specifically for that particular building. To facilitate service at a later date, the owner should be provided with a set of plans for any nonstandard items of this type.

Laws, Permits and Regulations. Design and construction should conform to all applicable laws and regulations. Make sure you know whether the contractor or the owner is responsible for obtaining and paying for required permits. Permits are typically required from Environmental Protection Agency, county, etc.

Changes. Nearly every building constructed will involve some changes from original plans and specifications. Both owner and contractor need to agree on procedures to be followed in accomplishing changes.

Substitutions. Delivery schedules, equipment model changes and price changes are all factors that can require substitutions during construction. Substitutions should be subject to the approval of the owner before being incorporated into the structure.

Insurance. There are four general types of insurance coverage required to afford complete protection during construction. State in the contract whether you or the contractor is responsible for securing adequate risk protection.

- A. **Workmen's Compensation Insurance.** Covers injury to employees working at the construction site. Usually provided by the contractor.
- B. **Public Liability and Property Damage Insurance.** Provides protection for the contractor and subcontractors from claims for personal injury, including death, and from claims of property damage. Usually provided by contractor.
- C. **Owner's Protective Liability.** Protects owner in event of liability claims arising from the construction project. May be provided by owner or contractor.
- D. **Builder's Risk Insurance.** Protects labor and on-site materials in the event of loss or damage by fire or other casualties. Usually provided by the contractor. May be an owner responsibility in "cost plus" types of contracts.

Payment. The written contract should specify the method and time of payment for the project. It is common for large projects to require payment of portions of the contract price at specific points during the construction process, with the final payment due on completion. Make sure the contract specifies who is responsible for payment of subcontractors on the project. Obtain lien waivers from suppliers before final payment is made to the contractor. Otherwise you may be forced to pay twice or face litigation even if you have paid for your equipment and materials through your contractor.

Storage of Materials. Weatherproof onsite storage of construction materials (if needed) may be either a contractor or an owner responsibility. The responsible party should be indicated in the contract.

Cleanup. Upon completion of the construction, the contractor is usually required to clear the site of all construction debris and to clean up building surfaces. Responsibility for cleanup should be stated in the contract.

Utility Connections. Responsibility for connection to electric, water, sewer and gas lines as required should be specified. Extension of utility lines to the building site should also be covered.

Warranties. Terms of the contractor-supplied warranty should be spelled out in the contract. Provisions should also be made for transferring to the owner any warranties provided by manufacturers or suppliers of component parts.

Service Manuals and Operation Instruction. The contractor should be responsible for providing the owner with operational and service manuals for component equipment. He should also provide instruction in proper operation of any equipment unfamiliar to the owner.

Time Schedule for Completion Date. For many construction projects it is essential that a completion date be known well in advance. Make sure both you and the contractor understand when the building is to be ready for owner acceptance and if the contractor should pay a penalty if construction extends beyond that date.

Reliability of Equipment. It should be the responsibility of the contractor for all equipment to operate properly when the building is accepted by the owner. If there is a need to go back to the equipment company for repairs or replacing something, the contractor is responsible until the building is accepted.

CHECKLIST BEFORE FINAL PAYMENT AND ACCEPTING BUILDING

It is important to go over a checklist with the builder before making the final payment and accepting the building. Points that should be covered are:

- Check working drawings to see if building conforms with drawings and that all details are included. Was all the equipment cited in the contract installed?
- Operate all mechanical equipment (motors, engines, feed conveyers, emergency power units, and air inlets) to see that they all operate properly.
- See that doors, gates and windows work smoothly.
- Check to see if you received service manuals and operating instructions for all equipment.
- Check the overall appearance of the building. Are there any flaws or irregularities in the materials used that you are unhappy with? Inspect the building and site for cleanup.

REFERENCES

Pork Industry Handbook

A handbook of more than 100 fact sheets on pork production available from your state Extension swine specialist.

Midwest Plan Service and other Plan Services

General plans and planning information available through your county agricultural Extension office or from

your state Extension agricultural engineer. Planning handbooks available are:

MWPS-2 *Farmstead Planning Handbook*

MWPS-8 *Swine Housing and Equipment Handbook*

MWPS-13 *Grain Drying, Handling, and Storage Handbook*

MWPS-14 *Private Water Systems Handbook*

MWPS-18 *Livestock Waste Facilities Handbook*

MWPS-28 *Farm Buildings Wiring Handbook*

Cooperative Extension Publications

Planning information available from your county agricultural Extension office.

Building and Equipment Sales Leaflets

Sales leaflets are available from individual companies. Many references are available from the popular swine magazines.

Popular Magazines

Several swine magazines are available to pork producers free of charge. Articles on producer experiences and planning ideas are often included. The common publications are:

National Hog Farmer

Webb Publishing Co.

1999 Shepard Rd.

St. Paul, MN 55116

Hog Farm Management

The Miller Publishing Co.

P. O. Box 2400

Minnetonka, MN 55343

Pork 88

Vance Publishing Co.

P. O. Box 2939

Shawnee Mission, KS 66201

Hogs Today

A Farm Journal Publication

Farm Journal, Inc.

230 W. Washington Square

Philadelphia, PA 19105

List of Independent Consulting Agricultural Engineers

Rural Builders Buyers Guide

("Rural Builder" supplement each October)

American Farm Building Services, Inc.

260 Regency Court

Waukesha, WI 53186

Phone (414) 782-0604

Annual Agricultural Engineers Guide to Products and Services

American Society of Agricultural Engineers

2950 Niles Road

St. Joseph, MI 49085

Phone (616) 429-0300

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