



pork industry handbook

COOPERATIVE EXTENSION SERVICE • MICHIGAN STATE UNIVERSITY

Combining Swine Housing Units into a System of Buildings

Authors

A. J. Muehling, University of Illinois
H. A. Hughes, Virginia Polytechnic Institute
H. W. Jones, Purdue University

Reviewers

Daryl W. Haerther, Strasburg, Colorado
Loren L. Losh, Strasburg, Colorado
Russ Jeckel, Delavan, Illinois
Orville Chamberlain, Urbana, Indiana

The advent of the specialized commercial pork producer has caused many changes in the typical swine production setup. Compared to old grain storage structures, low-cost lean-to structures, or portable units which were common in the past, the facilities of a commercial swine producer in confinement today are likely to resemble a pork production "factory." The size and other characteristics of the "factories" vary, but the typical unit is complete, including farrowing through finishing, feed processing, and waste handling. Most of the animals, which may include breeding stock, are kept in confinement. Capacities, in number of hogs finished per year, are highly variable. A unit of this type requires a large financial investment. Careful planning is essential when considering the initial setup and possible future changes and expansion to ensure that the system operates profitably and with a minimum of problems.

System Planning

The first principle of planning is to consider the whole system, not just one part at a time. As you plan a system, keep in mind the expansion planned 5-10 years ahead or longer. Consider the flow patterns of three major products—feed, pigs, and waste. Handle each with a minimum of labor and expense, but bear in mind that the building system must provide optimal environmental conditions for efficient pig growth and operators' comfort.

Site Selection

Proper choice of a site for your setup will not in itself ensure a successful operation. However, if you choose a poor location, you may be saddled with serious problems for a long time. Some factors to consider are:

Prevailing Wind Direction Locate downwind from your residence and any neighboring residence to minimize potential odor problems from your operation. When

possible, choose a location which protects the facilities from cold winter winds and snow accumulations.

Access to Roads Feed and hogs must be moved at all times of the year. An all-weather road for trucks delivering feed and marketing hogs is essential to connect your setup to the public road system.

Access to Power and Water Check the installation cost if you consider locating at a spot where electricity is not presently available. Many power companies charge for running a line to your new buildings. If possible, use a location where power is already available. If a high electricity demand is anticipated, check the availability of 3-phase power. Consider standby generating equipment with proper switching to disconnect from utility company source. Warning devices or an alarm system to indicate loss of power should also be considered.

Determine your total daily water requirements. A guideline for daily requirement is twice the weight of feed consumed plus wastage. Your source should be able to supply some reserve for peak demands and for future expansion. If you cannot provide enough water, choose another location or scale down the proposed facility.

Existing Facilities Evaluate existing facilities carefully. Use them only if they are located properly, are in good condition, and fit your system plans. Frequently, producers lock themselves into a location because of an existing building, even if it is in a poor location or is otherwise unsuitable. Eventually, a large complex could be situated in an unsatisfactory location.

Drainage Surface and sub-surface drainage is necessary for all buildings. There is no reason to locate in a low area that can result in wet conditions in and around the buildings. Construct the building above ground level and

use gravel fill under the floor to insure good drainage. Drainage from covered buildings is not as much of a problem as surface drainage from open lots. Proper collection and disposal of all runoff from open lots is necessary.

Environmental Concerns When possible, locate your hog production unit back from the residence and away from major highways. It is important to use good house-keeping and maintain a neat appearance, but it is still advisable not to locate too close to public highways where odors could cause public concern. Landscaping should be a part of the planning process.

Manage your waste handling carefully to minimize odors which affect your family as well as your neighbors.

Consider an active public relations program. Visit with your neighbors. Inform them as to what you are doing to help preserve the environment. Let them know that you are concerned. Allocate some expenses for barbecues, pig roasts, etc.

Zoning Check out local zoning laws and regulations for a proposed location. If it is zoned for other than agriculture, study the situation carefully before building. Even agricultural zoning is no guarantee that you won't be hit with a nuisance suit if you do a poor job of managing your operation.

Building Planning

The first consideration in planning your buildings is to determine the intended volume of production. Building sizes depend on the number and kind of pigs to be housed. These factors, in turn, depend primarily on the size of the sow herd and the interval between farrowings.

Phasing into Full Production When planning a total system, you must plan for a specific size. However, you do not have to reach that production goal immediately. Many times a producer will start with a conservative farrowing schedule, such as 4 farrowings per year, and increase the farrowing frequency as he develops his managerial skills and acquires capital. This also allows the building construction to be phased. Two buildings—farrowing and finishing—are needed initially. As the production schedule is expanded, a nursery unit can be added and, if necessary, the finishing unit can be expanded and facilities for the sows can be considered.

Future Expansion Always keep future expansion in mind when planning a system. Many operators have no intention of expanding when the system is initially established. But circumstances change rapidly, and increased production may be desired only a few years later. If possible, don't build yourself into a corner where expansion is not possible because of location or the arrangement of buildings.

Waste Management Plan your waste management carefully for the entire system. Check all waste regulations which may apply to your operation. Odors and water pollution are the major concern. Wastes must be handled properly so odors don't become a problem for the neighbors or the operator's family. All overflow and runoff must be controlled so there is no danger of ground-water or surface water pollution in the area. Decide if you want to retain maximum fertility value from the manure—different methods of handling greatly affect the fertility value when applied to the land for crops. Consider expansion at a future date when choosing and designing this system.

Reliability, Durability, and Simplicity When planning facilities, consider the factors of reliability of equipment, availability of repair parts, durability of materials, and

simplicity of design. Many systems will require considerable maintenance and repair in a short time. Use reliable, pigproof equipment that will not immediately require repair or replacement. For equipment that must function each day for satisfactory operation of the unit, such as feed augers, ventilation fans, waterers, and possibly some manure-handling functions, use reliable equipment for minimal maintenance. Good feeders can reduce feed costs by minimizing wastage. Reliable waterers minimize water wastage.

Durable materials also help reduce maintenance. Pen partitions, gates, and wall linings all must be durable to withstand hogs in confinement. Many hog buildings today have wall linings that lack durability and are not rodent resistant. Some buildings have required complete renovation after 2 or 3 years.

Producers today should seek simplicity in design, resulting in minimal maintenance. When the design is kept simple, fewer operational problems seem to arise. This is especially true for ventilation, heating, and waste management.

Building Spacing and Orientation Where several buildings are lined up together, sufficient space must be left between buildings to allow for adequate ventilation and operating space. More space for air movement is required between taller buildings than between low-profile buildings. For good air movement and adequate operating space for filling bulk tanks and hauling manure, provide a minimum of 40 ft. between buildings. Fifty to 60 ft. is better if big manure tank wagons (3,000 gal. and larger) are to be used.

Open buildings should be oriented so the open portion is away from the prevailing winter winds—usually they would face the south or east. Buildings that are gravity-ventilated should be oriented so the prevailing winds strike the side of the building rather than the end; locate them on a ridge instead of in a valley. Silos and similar obstructions to airflow should be located on the downwind side of the building to reduce turbulence. If the roof is to be used as a solar collector for heating, the orientation of the building in respect to the sun may need to be considered.

Plan for Fire Safety Many hoghouse fires have been reported over the past few years. These fires often have been traced to gas heaters and electrical wiring. New building materials with poor fire ratings have helped spread the fires once they were started. Many pigs have died, costly facilities have been lost, and human beings have narrowly escaped in these fast-burning fires. Insurance companies have become quite concerned about how the fires are started and what materials contribute to their rapid spread. More consideration must go into reducing these fire hazards, or the insurance companies will force producers through increased insurance premiums to build to reduce fire. Some insurance companies recognize construction techniques that reduce fire hazards with lower premiums.

Consider the following factors to reduce the fire hazard:

Choice of materials. Choose materials wisely. Eliminate materials that have a rapid flame-spread rating, or use an interior lining over them, reducing this hazard. Many of the new foam insulations may be such a hazard.

Electrical wiring. Follow an approved electrical code for all wiring. Careless wiring can be a cause of fires. Corrosion in exposed wiring and switches can cause shorts and result in a fire.

Heaters. Install all heaters properly. Provide routine maintenance as needed (cleaning, oiling motors, etc.). Inside gas space heaters have been identified as a major cause of fires. The new heaters located outside the

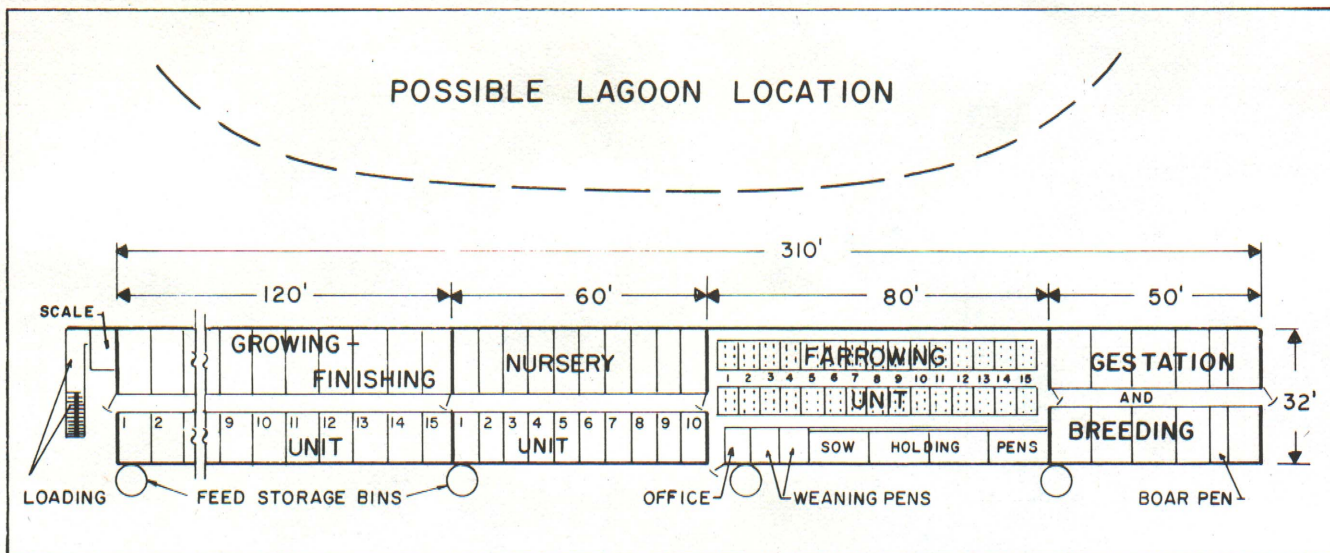


Figure 1. Production-line system—150-sow herd, 2,000 head marketed per year, farrowing 8 times per year.

building should reduce this hazard. Heat lamps and other heating units should be protected from the pigs at all times.

Fire walls. Many pork production systems have become quite large. In some systems the buildings are connected without any fire barriers. If a fire started in any part of these large, connected complexes, the entire unit would be lost. Use approved fire walls in large complexes to restrict a possible fire to one portion of the building instead of letting it spread throughout the entire unit.

Aesthetics Plan to give your pork production facilities a pleasing appearance. A little landscaping effort, such as grading the area and keeping the grass neatly mowed, can do wonders to improve the appearance of otherwise drab facilities and help promote pork products. Colored siding or regular painting can also do a lot to help the appearance.

There may also be a management benefit with attractive buildings. The manager will take greater pride in his system and, consequently, will tend to spend more time working in the buildings and caring for the animals. Building maintenance is usually also improved. Neighbors will not be as critical of a neatly kept place as they are of a messy, unsightly place.

Building Systems

There are several different methods of arranging buildings into a production system. Some systems are planned for a certain size in the beginning; others just grow as the producer expands. If existing buildings are used their worthiness in a long-range plan should be carefully evaluated. Three common arrangements being used are shown and discussed.

All farrowing units are planned for using 5 by 7 ft. farrowing crates. Currently when planning intensive systems, there is considerable interest in arranging the farrowing quarters in separate rooms. Each room should contain the number of farrowing crates for the sows farrowed each week. Provide one more farrowing room than the age of the pigs in weeks at farrowing. For example, 10 sows are to be farrowed each week and the pigs are weaned at 3 weeks of age; provide 4 farrowing rooms of 10 farrowing crates each.

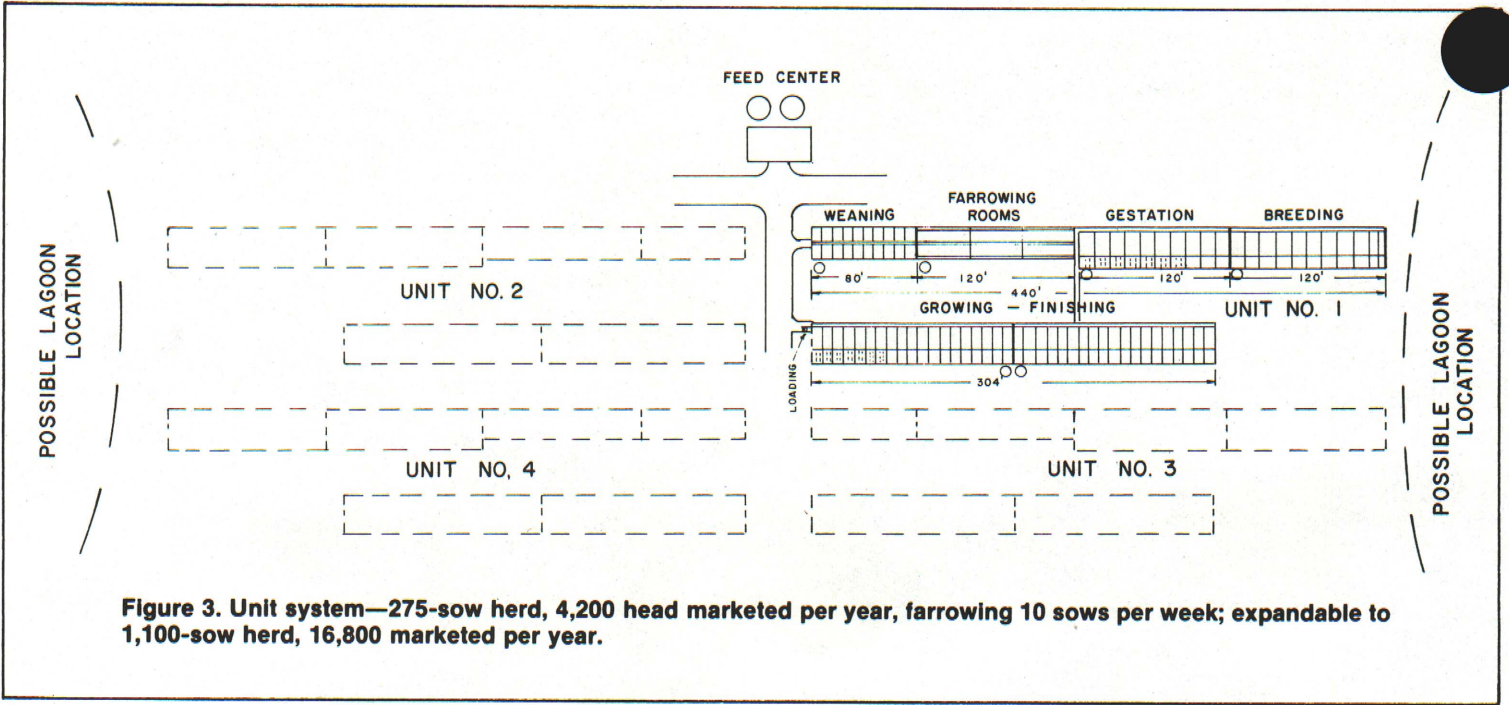
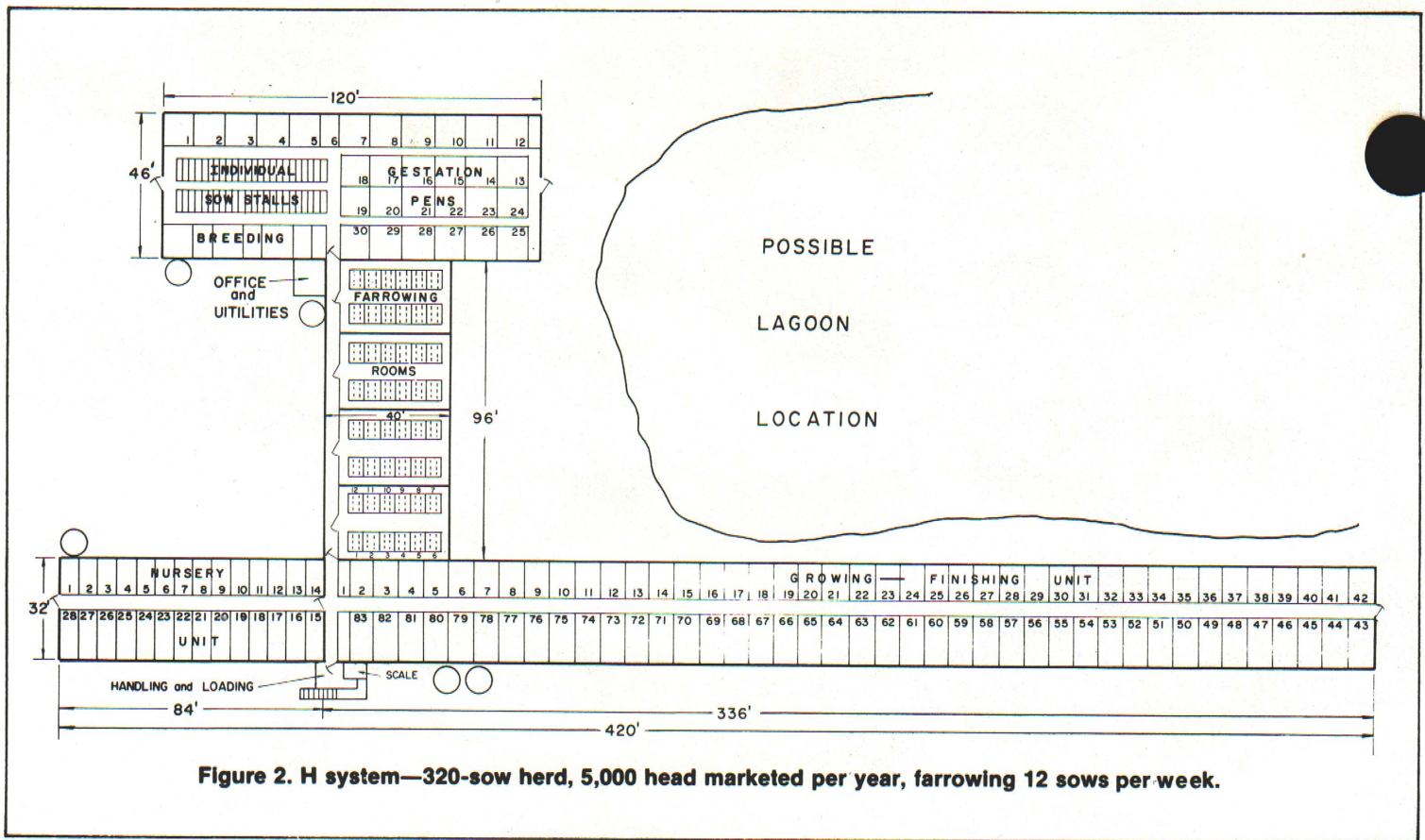
For nursery and growing-finishing facilities, space is planned by allowing 3 sq. ft. per pig to 40 lb., 4 sq. ft. from 40 to 100 lb., 6 sq. ft. from 100 to 150 lb., and 8 sq. ft. from 150 lb. to market. For sows in pens, 15-20 sq. ft. per sow is allowed.

Production-Line System The production-line system was developed as an in-line system and is very popular because of the ease of moving hogs. In systems with separate buildings, it is difficult to move pigs from one building to another even though the separate buildings are connected with a paved walkway. One man can move pigs almost any place within the production-line system. To keep the building from becoming excessively long, systems have been built with the farrowing portion turned cross-ways with a walkway running straight through the farrowing unit. The 32 by 310 ft. system shown in Figure 1 would handle 150 sows farrowing 8 times a year for about 2,000 head marketed per year. Expansion could be accomplished by building additional units alongside this one. The building could be lengthened for more frequent farrowings.

"H" System The H system features a breeding and gestation unit, a nursery, and a growing and finishing unit connected by the farrowing unit. This facility, shown in Figure 2, would handle a 320-sow herd farrowing 12 sows per week producing about 5,000 head per year. The farrowing unit shows four 12-sow rooms. When weaning at 3 weeks, one should be able to completely empty each room for easier cleaning. Expansion of the H system is somewhat more difficult. Most producers simply duplicate the system if they desire expansion.

Unit System Some people start with a complete unit and expect to add additional units as they expand. The unit system shown in Figure 3 features 2 buildings for a 275-sow herd farrowing 10 sows per week for about 4,200 hogs marketed per year. As this system is expanded, additional units will be added. Utilities, including a feed center, power, and water, are initially planned to handle the maximum size. As these systems get larger, waste management could be one of the major problems.

With the present high investment necessary for buildings and equipment, careful and complete planning is necessary. Before finalizing plans and beginning construction, visit successful producers and consult building and equipment representatives and university specialists. Where it is available, hiring competent private consulting help may be a good investment. Whatever housing system is chosen, it will be no more successful than the managerial ability of the operator. The facility only provides a tool for the capable manager to utilize for producing hogs.



This information is for educational purposes only. Reference to commercial products or trade names does not imply discrimination or indorsement by the Cooperative Extension Service. Cooperative Extension Service Programs are open to all without regard to race, color, or national origin. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8, and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Gordon E. Guyer, Director, Cooperative Extension Service, Michigan State University, E. Lansing, MI 48824. 1P-3M-7-77-UP, Price 10 cents, Single Copy Free to Michigan Residents
 Michigan State University Printing