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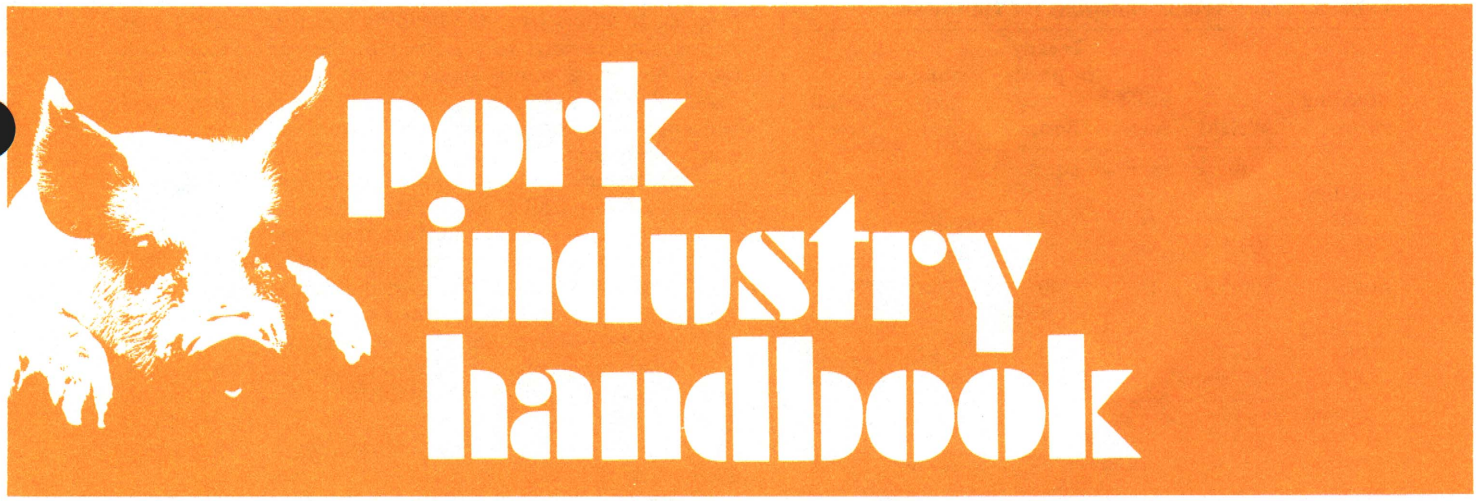

COOPERATIVE EXTENSION SERVICE • MICHIGAN STATE UNIVERSITY

Space Requirements for Swine

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The amount of space needed per pig for optimal performance is an important planning-management consideration for modern production systems. Failure to plan for adequate space causes problems with overcrowding, scheduling, and a host of animal interactions. Research has led to general recommendations but many variables exist between individual farms. Thus recommendations based upon research must be tempered with good judgment and common sense. Most recommendations are based upon animal performance criteria. However, overall well-being of the pig is also important.

General Space Management

Too few pigs per pen increases initial building and equipment investment. However, care must be taken to prevent overcrowding. The results of overcrowding may include tail biting or cannibalism, reduced gain, increased feed required/unit gain, gastric ulcers, and/or additive stress factors. Various levels of these, plus others, may cause increased susceptibility to disease or other adverse effects on performance or reproduction.

It is generally impractical to provide the optimal area per pig at all stages of the life cycle because the pig is continuously increasing in size, and space requirements change at a similar rate. Movement of pigs from one building to another to provide optimal space has, in at least one study, caused setback in pig performance and health. Moving pigs to larger pens to adjust for increased size may be best accomplished when the move is within a building rather than between buildings, especially for young pigs. For most producers, providing optimal space must be a manageable compromise between adjusting the pen size and/or the number of pigs per pen. Optimizing pen occupancy is perhaps best achieved by utilizing pens of increasing size. Mixing groups of pigs is a risky method of obtaining optimum occupancy.

Tables 1-3 give space recommendations based upon current research and field observations that take into account most factors. Space recommendations may vary slightly between sources.

Space requirements for flat-decks and battery cages have not been well established. However, these types of weaning facilities are generally stocked at a rate of at least 2.0 sq. ft. per pig to a terminal weight of 40 lb. Apparently, the higher stocking density is functional because of the smaller size group characteristic of this system, as compared to a conventional nursery and the greater cleanliness and sanitation of the wire floors. See PIH-77, *Decking for Nursery Pigs.*

Table 1. Space recommendations for nursery-growing-finishing pigs using partial or total slats.

Pig weight or class	Space for partial or total slats
lb.	sq. ft.
15-30	1.7-2.5
30-60	3-4
60-100	5
100-150	6
150-market	8*

* Adjusting pig numbers per pen seasonally may result in improved performance. For example, increasing the number per pen by 1 or 2 pigs during winter or decreasing the number in summer may be desirable.

Table 2. Space requirement recommendations for each animal using building with outside apron.

	Sq. ft. needed	
Class	Inside	Outside
Growing-finishing	6	6
Sows	11-12	11-12
Boars	40	40

Table 3. Space recommendations for mature swine.

Breeding swine	Weight	Solid floor	Totally or partly slotted floor*	Animals per pen	Stall size**
	lb.	sq. ft.	sq. ft.		
Breeding					
Gilts	250-300	40	24	up to 6	
Sows	300-500	48	30	up to 6	
Boars	300-500	60	40	1	28″ x 7′
Gestating					
Gilts	250-300	20	14	6-12	22″ x 6′
Sows	300-500	24	16	6-12	24″ x 7′

* Or flushed open gutter. Open gutter not recommended in breeding facilities because of slick floors.

** For some breeds, consider lengthening the stall at least 6 in.

Space Management on Solid Floors

With solid floors, bedding of some type should be used, at least during winter or seasonally with small pigs. Since most floors have about ½ in. slope per foot, the bedding often becomes scattered and does little good. Many producers have found it practical to use a "bedding board" to help hold the bedding in place (Fig. 1). Generally, the bedding board will be a 2 x 6 or 2 x 8 plank secured on edge and placed initially far enough from the back of the pen to give the pigs only as much space as needed to rest comfortably. As the pigs grow, the bedding board should be moved outward in increments of about 2 ft. This not only holds the bedding in place but trains the pigs to step over the bedding board to dung and urinate, thereby preserving the bedding and reducing labor. A 3 ft. high movable solid panel with a small door off to one side is similar to the bedding board and can be used, but be watchful for pig traffic, dunging, and/or ventilation problems.

A variation of the bedding board is the crowding panel (Fig. 2). It differs from the bedding board in that the pigs are usually crowded to the front of the pen initially with the panel being moved back in increments of approximately 2 ft. as more space is needed. The crowding panel is usually solid rather than mesh so that air movement or drafts are reduced.

This system has the advantage of not allowing any unnecessary pig traffic into most of the pen when the pigs are small. This prevents indiscriminate messing in nonessential space, thereby reducing labor and preserving bedding. A disadvantage of the crowd panel is that in some systems the pigs will be crowded to the open side of the building or toward a door. Since the pigs will usually be small when the panel is used, crowding toward an opening during cold periods may result in more severe pig health problems or reduced performance. Thus a combination of crowding panel and hover is often used for smaller pigs during cold weather.

There are variations of the bedding board and crowd panel other than those illustrated. The point intended is that management techniques can reduce labor and bedding wastage with solid floor systems and can result in more profit from the enterprise.

Space Management on Partial Or Totally Slotted Floors

For some systems with slotted floors, crowding panels may be utilized to adjust space needs. However, since a crowding panel in this type system dictates feeder and waterer location without regard for other management considerations, it is not used widely. Most producers who adjust pen size or move pigs during the growing-finishing period find it practical to make one or two moves or adjustments for a particular group of pigs. Frequency of farrowing may be a factor in deciding how often the pigs should be moved. Greater farrowing frequency usually results in, or justifies, more frequent pig movement in the growing-finishing barns to adjust for space needs. Move-

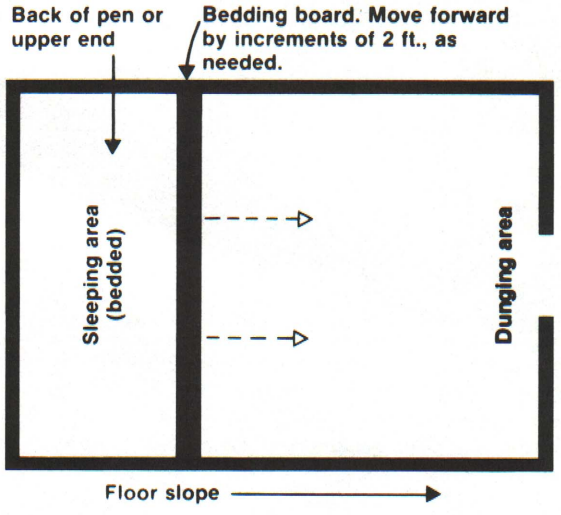

Figure 1. Scheme showing how a bedding board is used to contain bedding and to toilet train pigs.

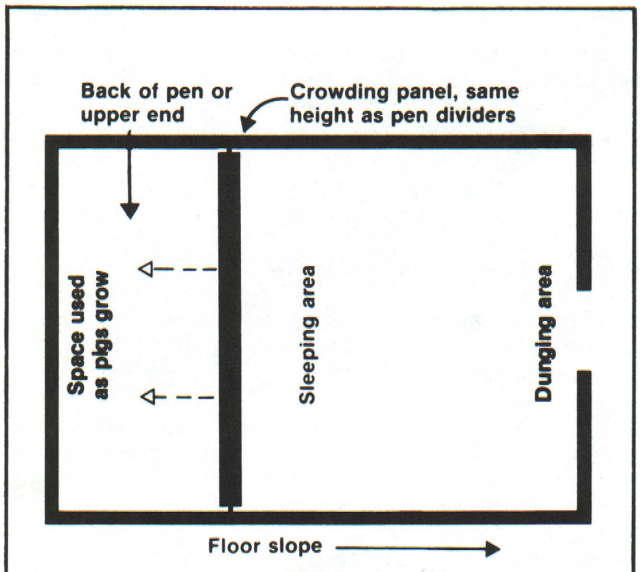

Figure 2. Scheme showing the general layout for a crowding panel as a management tool.

ment of pigs should not include mixing pigs from two or more pens, as fighting results and death loss frequently increases. Examples of schemes using a one-move growing-finishing system are shown in Fig. 3.

In Fig. 3, scheme 1, the 6 ft. wide pens would house about 28 pigs per pen to an average weight of approximately 100 lb. At that weight, they will have "outgrown" the smaller starter-growing pens and will be moved to the larger finishing pens. This will free the smaller pens for repopulation. A disadvantage of this scheme and variations of it is that from a pig health viewpoint there are usually older pigs in the building when younger and more susceptible pigs are brought in. Consequently, strict within-pen sanitation, including washing and disinfecting, should still be practiced before new pigs are brought into the empty pens.

Growing-finishing buildings with an off-center alley allow the producer simply to move the pigs across the alley as they outgrow the smaller pens. This scheme can be employed with either partial or total slotted floors.

A disadvantage of scheme 2 in Fig. 3 is that the nursery growing pens are more nearly square than is generally considered desirable for partially slatted floors. A more rectangular pen (width:length ratio of 1:2 to 1:5) encourage better dunging patterns. As pens become more nearly square, totally slotted pens are often recommended to eliminate the concern about dunging problems. Great care is necessary to ensure that pig comfort is not sacrificed as a trade-off in "solving" dunging problems. Even so, this arrangement may be considered practical and will allow for greater economy of space utilization than if the pens were all the same size. The same sanitation-disinfecting situation is true for this scheme as for scheme 1.

There are other schemes that attempt to more efficiently utilize space. Most are very specific for the particular manager involved, and their success is more a function of management than of any mechanical feature. The system that puts 30-40 lb. pigs in a pen, allowing 8 sq. ft. per pig and leaving them until market weight, is common even though the pig initially has about twice as much space as it needs during the growing period. Some producers feel simplicity and ease of management partially compensate for the somewhat inefficient space utilization in this system. A combination of 6, 8 and 10 ft. wide pens is a common alternative system for two moves.

Number per Pen

Pen size, and thus number of pigs per pen, varies depending upon management goals and understanding or interpretation of requirements and recommendations. Family units or litters penned individually perform very well in comparison to larger groups. However, the number of pigs per pen, on a practical basis, usually reflects a compromise between equipment and pig numbers. Again, management is perhaps as important as numbers. As number of pigs per pen increases, the within-pen competition might increase and result in reduced performance. Research and field experience show that the compromise between equipment and growing-finishing pig numbers per pen is somewhere between 20 and 30 pigs in totally enclosed, as well as modified open front, housing. For buildings with outside aprons or dirt lots, larger groups are practical as long as the requirements for feeders, waterers and sleeping area are met.

Seasonal Effect on Space

Given an opportunity a pig can and will adapt to changing environment. For example, as part of his thermal regulatory mechanism in cold environment, the pig will attempt to make itself as small as possible and lay close to its pen mates. In warm environment the pig attempts to make itself as large as possible and lay away from its pen mates. This has management implications that suggest

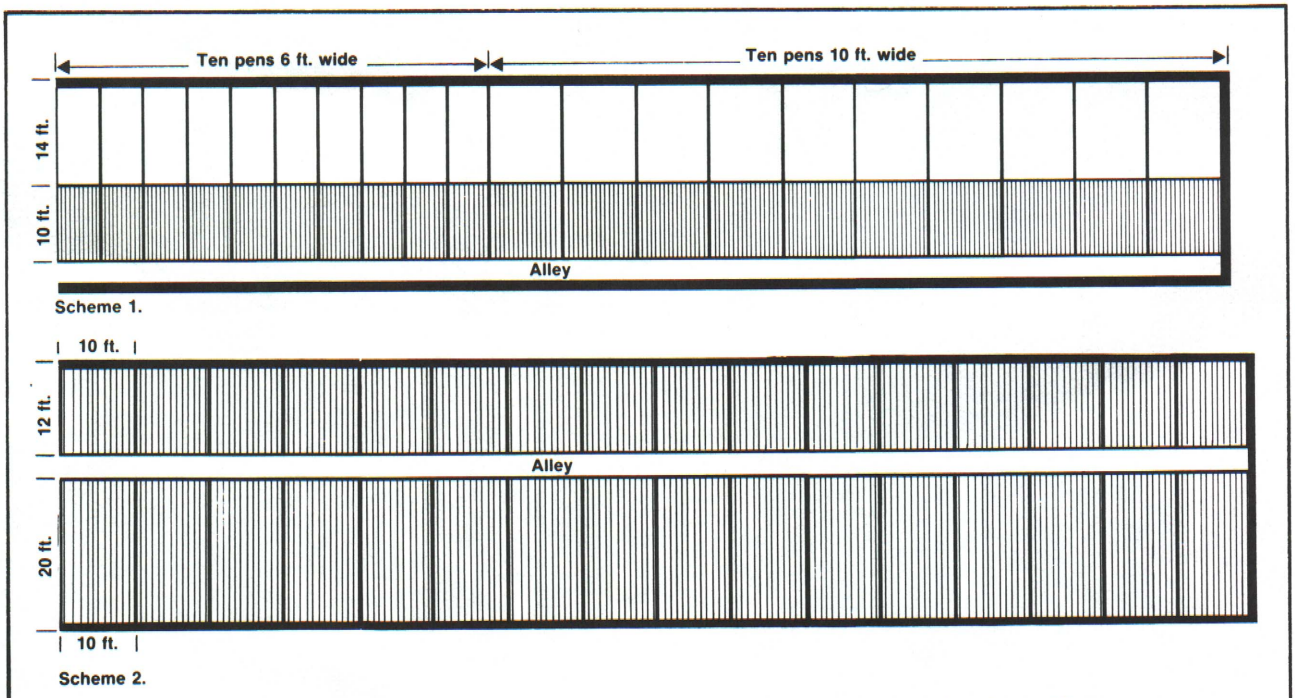

Figure 3. Two schemes showing floor arrangements for units for growing-finishing pigs that utilize space more efficiently than buildings with pens all the same size.

adding 1 or 2 pigs per pen in winter and removing 1 or 2 pigs during summer.

Wallows are an effective method of enhancing pig comfort during summer in outside lots especially for mature swine. Wallows should be durable and designed with comfort and hygiene in mind. Avoid shaded wallows as pigs will tend to lay in it for long periods of time which may lead to health problems. If located in the sun, pigs tend to remain in the wallow only briefly, returning to a shaded resting area where evaporation of the moisture will have the desired cooling effect. Wallows must be designed and constructed to allow periodic cleaning as well as routine maintenance.

Pasture and Dirt (Soil) Lots

Space recommendations for pasture and dirt lots are difficult to make for a fact sheet with national and international exposure because of the great climatic variability and wide range of economic considerations attached to land values. Thus, only generalizations may be made. Table 4 provides information on pasture and shade space. Pasture recommendations, which take into consideration the nutritional value of the available forage, should not be confused with dirt lot recommendations which do not. Therefore, producers who provide 150 to 200 sq. ft./pig on dirt lots would need to provide 400 to 800 or more sq. ft./pig under pasture conditions. When pigs are managed outside on soil, space per pig is a secondary consideration to the condition of the space. Hence, good judgment, management, and the ability to adjust on short notice to rapidly changing conditions characterize good managers of this system. Basic to soil orientated swine production are lots with the correct slope. Slopes of less than 2% are generally considered insufficient under most conditions while slopes over 5% may be excessive.

Table 4. Pasture and shade recommendations.

Pasture space	
(depends upon rainfall, soil fertility, and plant growth)	
10 gestating sows/acre	
7 sows with litters/acre	
50 to 100 growing-finishing pigs/acre	
Shade space	
15-20 sq. ft./sow	
20-30 sq. ft./sow and litter	
4 sq. ft./pig to 100 lb.	
6 sq. ft./pig over 100 lb.	

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