

NPB Sow Housing Calculator

Mark Boggess, Ph.D.

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Introduction:

Some producers in the pork industry are currently moving to eliminate the use of individual gestation stalls in favor of an open housing system. This easy to use computer based tool – the NPB Sow Housing Calculator – will assist producers dealing with the issues and challenges related to modifying their current gestation facilities to accommodate a change to a loose housing system or build a new gestation facility. Either environmentally controlled and hoop housing options are contrasted in the calculator.

Three basic programs are presented to evaluate the production and financial implications between the following types of housing systems for gestating sows: (1) remodeling of an existing individual stalls gestation building into a facility that houses sows in pens, (2) a new gestation facility that houses sows in pens, and (3) a new hoop structure that houses sows in pens and feeds the sows either indoors or outdoors. Producers input their own production and construction costs and the calculator produces a financial cost and production level comparison.

The main input categories of the model include:

- cost of building structure
- cost of equipment
- annual ownership cost, and
- annual variable costs.

The following annual variable costs are input to match each producer's production system:

- labor
- feed
- utilities
- veterinary & health supplies
- semen cost
- loan payment, and
- depreciation on breeding stock.

After the total annual ownership and variable costs are calculated, the user can adjust the reproductive performance values (farrowing rate and number of piglets weaned per litter) to determine their effect on cost of the gestation phase per pig weaned. Once all factors have been evaluated, sensitivity tables are produced to address production and construction costs on a per pig basis and varying levels of production. Additional housing space is determined along with required adjustments in gilt inventory for remodeled buildings.

Version 2 of the Sow Housing Calculator is currently in production. Version 2 will enable producers to contrast and compare different loose housing systems including systems featuring:

- electronic feeding stations
- free access stalls
- trickle and floor feeding systems
- deep bedding options
- minimal bedding options

Conventional Housing

Sows and gilts are typically housed in gestation stalls (22 to 24 in. [56 to 61 cm] wide x 84 in. [213 cm] long) for most of their productive lives (2.5 to 3 years). Indoor intensive housing systems were developed to:

- 1) allow for economically efficient pork production
- 2) eliminate aggressive behavior at time of estrus and feeding
- 3) reduce injuries due to riding and fighting
- 4) reduce labor
- 5) prevent harsh outdoor environmental affects on welfare of animals (i.e., extreme cold, extreme heat, injury to feet and legs due to frozen ground, excessive mud lot conditions, etc)
- 6) ensure each female received an adequate volume of feed
- 7) facilitate medical treatment of sick animals
- 8) reduce feed cost, and
- 9) improve reproductive performance by hand-mating or artificially inseminating estrous females in an adequately designed breeding facility.

Housing of sows in groups is becoming a commonly used housing method in modern pig production in Europe and now in the US because of welfare concerns and legislative requirements. Although the size of the pork production enterprises in the United States is substantially larger than those in the majority of Europe, it is very likely that pork producers of all sizes in the United States will consider a system to house sows in a group environment in the foreseeable future.

The alternative to housing sows in individual gestation stalls is some type of group-housing. Although some perceive that group-housing systems are more welfare friendly, the housing of sows in groups may produce the following welfare problems:

- 1) aggression during mixing of animals and at weaning
- 2) aggression at time of feeding when individual, non-locking feeding stalls are not used
- 3) bullying by dominant animals
- 4) feet, leg and back injuries due to excessive riding of each other during times of estrus
- 5) excessively high feed intake by dominant animals when floor fed
- 6) excessively low feed intake by subordinate animals when floor fed

- 7) vulva biting, and
- 8) wounds and scars from fighting.

Additionally, maintaining reproductive rates and ideal condition scores are typically more difficult in group housing systems compared to stalls.

A large number of variables are involved with the design and management of gestation facilities for group housing of sows. Although several European countries have specific regulations for designing and managing swine gestation facilities, the majority of variables involved with the design and management of a gestation facility for group-housed sows have not been investigated by scientists in the United States or foreign countries. The majority of the research has focused on the welfare of sows housed in individual stalls. While some research has been conducted on the welfare of sows housed in groups, the effect of housing design on productivity of sows and gilts has not been extensively investigated in the US and there is no consensus as to which is the best system, in fact all gestation sow housing systems have their benefits and challenges and all require superior animal husbandry skills and management expertise. However, for producers considering retrofitting existing gestation housing systems or in the process of building new facilities this program will help compare and contrast production and financial implications.

For more information contact: Mark Boggess, Ph.D., Director of Animal Science, National Pork Board, 515 223 2606, mboggess@pork.org.