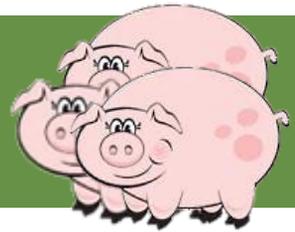


Innovative feeding system for gestating sows in groups



Introduction

All Canadian producers must comply with the requirements of the Animal Care Assessment (ACA) program, which have been included in the Canadian Quality Assurance (CQA) program since January 2012. Also, a draft of the new Code of practice for the care and handling of pigs was made public on June 1st, 2013. This new Code is based on the ACA requirements and proposes several significant changes. The main change is the requirement to house gestating sows in groups.

To meet these requirements, an innovative feeding and housing system for gestating sows in groups was developed as part of a project conducted jointly by the Centre de développement du porc du Québec Inc. (CDPQ) and Jyga Technologies inc. This new feeding system, which allows individualized feeding of sows in groups, can easily be adapted to both smaller farms and larger ones at a lower cost compared to other existing systems.

System Description

The Gestal individualized feeding system for sows in groups consists of three known technologies; a free access stall, a "Gestal Solo" feeding system from Jyga Technologies Inc for lactating sows, which was adapted, and an antenna allowing to read tags on sows. To feed, the sow must enter the feeding station. Upon identification of the sow, the system distributes feed if the sow has not already consumed all of its daily ration. Once the meal is finished, the sow must back out of the station, through the same door it entered. This new system is not yet available on the market, but it will be by the end of 2014. This system will be offered in two versions, one that distributes one type of feed and the other that is able to distribute two types of feed.

Gestal Feeding Station for Sows in Groups

Each feeding station is offline, which means that the decision to feed a sow or not will be taken by the station itself. This information will then be immediately transferred to other stations on the farm. In addition, it works using a wireless technology similar to WiFi which facilitates its installation on the farm. With this technology, the various reports can be accessed from a desktop computer, an external computer or from a smart phone, and all parameters can be adjusted through these various means. Also, the breeder can use a portable electronic tag reader to find a sow in the pen and to change its individual settings.

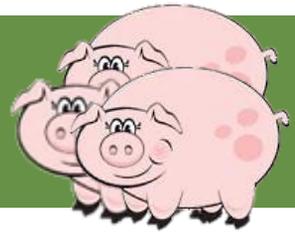
This new system will make things easier for breeders who use it. Nine different feeding curves are already configured in the operating system (possibility of 1,000 curves); three different curves depending on the body condition (lean, healthy, fat) of gilts, parity 2 and 3 sows and parity 4 and higher sows.

During the sow's first visit in the station, an individual file for the sow is automatically created in the computer system, thus avoiding having to create it manually.

Also, the sensor in the feed reserve avoids serving empty meals and an optional marking system will be available to colour spray paint particular sows (i.e. sows to be vaccinated etc.) in the group.



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Finally, the feeding system as well as the feeder are removable. Should they break down, they can be sent to the supplier for repair. This helps preserve farm biosecurity, because it avoids having repairmen coming onto the farm.

Free Access Stalls

The feeding system consists of a free access stall in which an anti-sleeping bar has been added to prevent sows from lying down. Also, dry feed is distributed without water, which causes sows to be thirsty after finishing their ration and therefore, quickly exit the feeding station to drink. The operation principle of the feeding stall is described below.

Sequence of action which allows the sow to enter a feeding station



They can only enter if the station is open



The sow must push a metal plate at the end of the station



This tips the door and closes it behind the sow



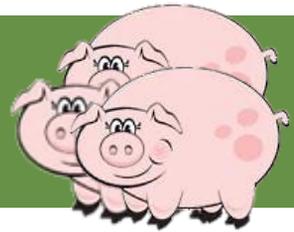
And locks the door automatically

Sequence to exit the stall



The sow simply backs up and the double-door mechanism unlocks and allows it to open.

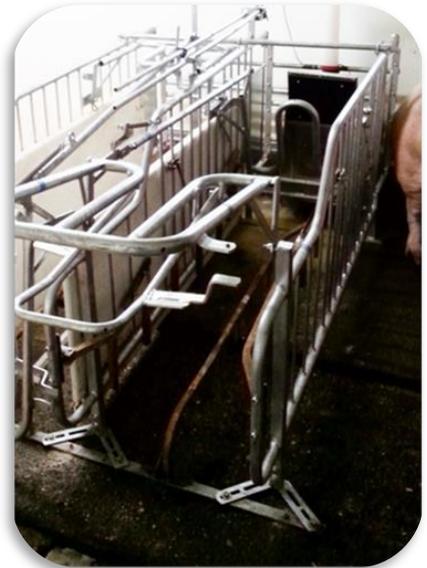
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Layout Criteria to Respect

The design and layout of the pen is extremely important to avoid confusion in the group. All pens using this new feeding system must have three distinct areas: a feeding area, an activity area and a rest area.

- Feeding area
 - Installed behind the feeding stations on the slat floor
- Activity area
 - Minimum of 8 ft. wide (ideally 10 ft.)
 - Free space behind the stations of at least 8 ft.
 - Have a slatted floor, since sows will defecate in this area
 - Install the water points in this area, close to feeding stations
- Rest area
 - Plan for rest areas that are 6 to 7 ft. deep by about 10 ft. long
 - Prefer solid flooring with full pen divisions, as sows prefer to lie down and lean on a solid surface
 - Design ventilation to avoid air draughts during the cold season and inversely, be able to direct them in this area during the summer.



Number of Feeding Stations Required

According to observations made with the prototypes, sows spend an average of 33 minutes per day in a feeding station and usually visit it once or twice a day. Since all sows should be fed within less than 16 hours (Pig Research Center, 2012), one station could theoretically feed up to 29 gestating sows. However, the system has not yet been tested with that many animals. Presently, the manufacturer recommends **20 sows per station**.

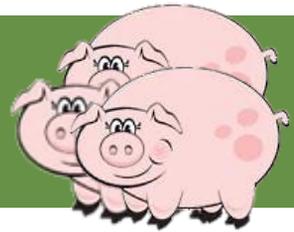
In the **training pens**, more than one station should be installed to facilitate and speed up the learning process since sows learn largely through imitation. A ratio of **7 to 10 gilts per station** is recommended by Jyga Technologies Inc.

Sample Layout Plans and Estimation of Renovation Costs

As part of this project, sample layout plans respecting the Canadian Code's minimal standards have been developed by the CDPQ. The costs of renovation were also evaluated. The buildings have not been expanded and the same number of productive sows were retained.

The sample layout plans can be found in the project report (Turcotte *et al.*, 2013) available on the CDPQ web site.

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Two scenarios are proposed, a low cost renovation and a major renovation and both for three different building sizes; 250, 550 and 2,400 productive sows.

Low Cost Renovation

The floors are left as is except for the manure slides in the gestation slats which are blocked using a metal plate and galvanised steel rivets designed for use in concrete. Also, the concrete is redone under the drinkers which have been removed in order to obtain a smooth floor.

Major Renovation

The floors are broken up in order to install a fully slatted floor in the centre of the building, except for the concrete along the exterior walls which is retained and will be used as rest areas for sows.

Parameters Taken into Account in the Economic Evaluation

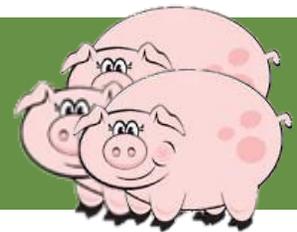
- Labour to remove the old equipment
- Labour and materials for renovating the building
 - Level the floors (low cost renovation) or breakup and redo the concrete (major renovation)
 - Modification of water lines
 - Modification of electricity (1- 120V outlet per station on an independent electrical circuit)
 - Redo the finishing on the lower part of the outlining walls to solidify them to avoid that sows destroy it
- Purchase and installation of new equipment
 - Concrete slats and scrapers for manure disposal (major renovation only)
 - PVC and metal pen divisions and galvanized steel posts
 - A gate with a manway to facilitate the work
 - Automatic feeder (reuse of existing transmission if doing low cost renovation)
 - Water points (1 per 10-15 sows) and Gestal feeding station (1 for 15-20 sows)

Renovation costs depending on the number of productive sows and type of scenario

Productive sows	Low cost renovation (\$/productive sow*)	Major renovation (\$/productive sow*)
250	377	541
550	322	459
2 400	278	405

*10% contingency included

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The Gestal system for sows in groups is very accessible and costs less than other systems. In fact its purchase price is 17 to 50% less than an ESF system, depending on the manufacturer and options chosen and will vary depending on the number of sows per Gestal station.

Equipment cost comparison depending on the feeding system

	ESF ¹	Short Stall ¹	Free Access Stall ¹	Gestal station
Cost/productive sow	150 to 250	90 to 105	180 to 200	125 to 166

¹ 2012 Data from equipment suppliers

In conclusion the system allows for the use of 100% of the building's surface by sows, which permits to keep the same number of sows in the building while respecting the Canadian code of practise for the care and handling of pigs.

References

Code of Practice for the Care and Handling of pigs. 2013. http://www.nfacc.ca/resources/codes-of-practice/pig/pcp/Pig_Code_DRAFT_May2013.pdf

Turcotte, S, Ricard, M.A. and A. Lefèbvre. 2013. Développement d'un système d'alimentation novateur pour truies gestantes en groupe. Québec : CDPOQ, In press.

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