

Effect of Rubber Flooring and Social Grouping on the Utilisation of Free Space for Sows in Walk-in/lock-in Stalls

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SUMMARY

Walk-in/lock-in stalls (also known as free access stalls) are a group housing system that provides sows with individual feeding protection, with the ability for sows to also freely enter or leave the stalls to loaf in a communal “free space” area. Walk-in/lock-in stalls are a very flexible system that is relatively easy to manage compared to other group housing systems, but a common finding is that many sows tend to remain in the stalls, and thus do not gain the benefits associated with group housing. This study investigated whether the addition of rubber mats to the free space area of two pen configurations would increase the amount of time that sows spend in this area. A second objective of the study was to examine the effects of grouping high and low parity sows separately, to determine if this would result in the increased use of the free space area by younger, lower parity sows. Results show that in the I-pen configuration, both ‘young’ and ‘old’ sow groups spent significantly more time in the areas with rubber flooring than concrete flooring ($P < 0.05$), while in the T-pens, only the young group increased their use of the free space area when rubber flooring was applied. Sow body posture on the rubber flooring indicated an increase in sow comfort, with a greater amount of lateral lying observed.

INTRODUCTION

One alternative to gestation stalls are walk-in/lock-in stalls, a group housing design which provides sows with individual feeding protection, and gives them free choice to in either a communal area or to remain protected in a stall. A previous study at the Prairie Swine Centre investigated the use of communal loafing areas by sows in of walk-in/lock-in stalls and found that, although the majority of sows did use the free space areas ($> 95\%$), most did not use the space on a regular basis or for extended periods of time. More than half the animals in that study spent $< 5\%$ of their time in the free space area, and the average usage was approximately 18%.

It was also apparent that older, heavier sows utilised the free space area the most, leading to the conclusion that younger sows choose to remain in stalls due to social stress- specifically fear of older sows. The objectives of this study were to investigate if it is possible to increase the amount of time that sows spend in free access areas by: i) fitting rubber mats in the free space area to increase sow comfort, and ii) grouping sows of similar parity to reduce fear in younger/smaller (subordinate) animals.

“Young and Old sow groups spent significantly more time in the areas with rubber flooring than concrete”

EXPERIMENTAL PROCEDURE

The study was conducted at the Prairie Swine Centre’s dry sow unit, with walk-in/lock-in gestation pens. Sixteen groups of 16 sows were studied using three experimental treatments, arranged in a 2x2x2 factorial design. The treatments consisted of 1) being

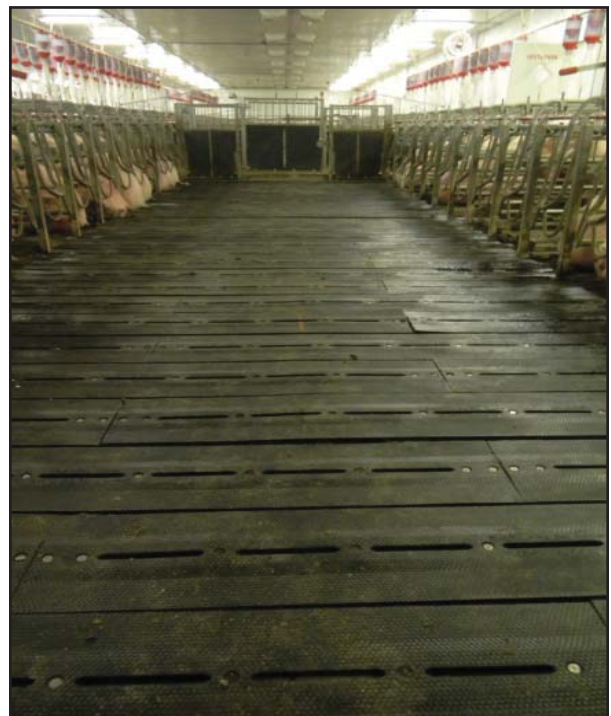


Figure 1. Rubber slats installed in an I-pen.

housed in the 'I' or 'T' pen configuration; 2) with either rubber mats (T-pens) or rubber slats (I-pen, see Fig. 1) or concrete flooring; and 3) in groups of high parity sows (parity 3.3 ± 1.9 ; mean \pm S.D) or low parity sows and gilts (parity 0.4 ± 0.6 ; mean \pm S.D). Figure 2 demonstrates how the rubber slats were installed in the I-pens. The 'I' pen consists of an alley (3.0m x 10.7m) with slatted flooring running between two lanes of 16 stalls on each side. Any additional stalls, surplus to the group number were locked for the purposes of the trial. The second pen configuration is referred to as the 'T' pen and consists of an identical alley with the addition of a solid floor loafing area at one end (3.8m x 7.1m).

Pigs were moved from the breeding room into the gestation room at five weeks post-breeding, and were individually weighed and marked with livestock paint. The first week after grouping was used to ensure that the gilts and sows were familiar with how to open and close the stalls. A technician worked with sows each day, training them to exit and enter the stalls. Photographs were taken from mounted cameras set to shoot automatically at five minute intervals over a 24 hour period, once per week, throughout eight consecutive weeks during the gestation period. Photographs were

analysed for sow behaviour (number of sows utilising free space and lying postures) by a trained observer. Once per week both the sows and the pen floors were assigned a cleanliness score, ranging from 0 (completely clean) to 4 (body, flank, legs, and hooves/entire pen soiled).

RESULTS

Space usage

There was no significant difference between the average usage of free space area between young (low parity) and old (high parity) groups. This result is different from that of a previous study conducted at the Prairie Swine Centre where all sow groups were of mixed parity, and in which the older, heavier sows utilised the free space the more frequently than younger sows. In this study, young and old sows were housed separately, and thus the younger sows were likely more confident to exit the stalls due to the absence of older, more dominant sows. The overall usage of free space in the present study was similar to that found previously, with most pigs spending less than 10% of time outside the stalls. There was a significantly greater use of free space areas with rubber flooring compared to concrete flooring ($P < 0.001$), with the exception of older sows housed in T-pens (no significant difference between rubber and concrete flooring). The greatest difference in usage

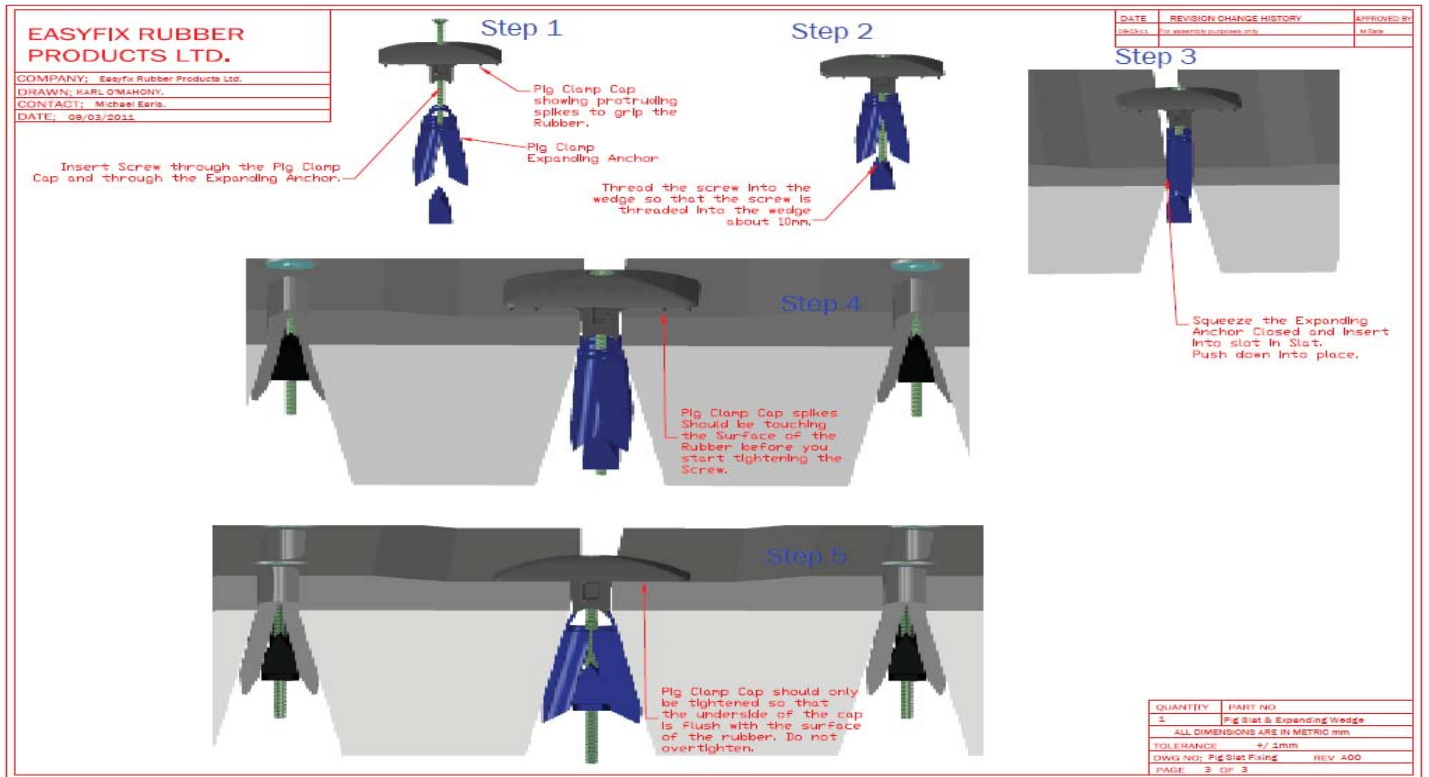


Figure 2. EasyFix Rubber Products™ patented sow slat attachment system.

between rubber and concrete flooring was observed in the I-pen configuration, with sows spending an average of 14% of their time out of stalls (min = 0%, max = 71%). These results suggest that the combination of rubber flooring and social grouping have helped address the issue of encouraging young sows and gilts to access the free space. However, in order to get optimal benefits from this housing system, there is still a need to increase the overall usage of free space areas, perhaps by the addition of enrichment or water drinkers in the free space. The training of young sows and gilts to access and exit the stalls in the initial week also appears to be beneficial, and this practice is recommended for those operating similar walk-in lock-in housing systems.



Figure 3. A sow shown lying laterally on solid rubber matting in a T-pen.

Sow Posture

While sows were lying in the free space areas, high levels of lateral lying (Fig. 3) were observed in both pen configurations (I and T), with significantly more lateral lying observed on the rubber flooring. Sternal lying (upright on the chest) was higher in the pens with concrete flooring. Lateral lying is a sign of comfort in sows, so these results indicate that the sows were more comfortable on the rubber mats. Lying comfort is an important component of swine welfare, as sows in intensive housing systems are known to spend up to 80% of their time lying.

Cleanliness

Sow cleanliness scores show that sows in pens with rubber floors were significantly dirtier than pigs from pens with concrete floors. Although this result was statistically significant, the differences were minimal, and the overall scores of all the sows in all the treatments were relatively low. Most sows received cleanliness scores of 1 and 2, with sows few scoring 3, and no sows scored as 4. The cleanliness of flooring in each pen was also scored weekly, and no significant differences were found between rubber and concrete, or I- and T- pen configurations. This result indicates that pen cleanliness was not compromised by using rubber. Another consideration that has yet to be fully determined is the long term maintenance and durability of the rubber flooring. During the study

regular maintenance of the flooring was required, especially in I-pens, where some sows were able to root up sections of the rubber flooring. Thus improvements in rubber slat attachment are needed to make this a practical solution in commercial practice.

CONCLUSIONS

The addition of rubber flooring to walk-in/lock-in stall housing was effective at increasing the use of free space areas by gestating sows, and was particularly effective for low parity sows and gilts. Although the addition of rubber mats resulted in a significant increase in use of the free space area, overall usage averages < 10% of the time for most individuals. The quality of the free space area offers no resources (food or water) and nothing for sows to do upon exiting their stalls (ie environmental enrichment). To further increase usage of the free space, it may be helpful to add enrichment such as straw racks, drinkers, or enrichment devices. The goal of adding such resources would be to maximise the exercise benefits of group housing, and to encourage use of the free space area while reducing dominance and aggressive interactions between sows.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge specific project funding for this study provided by the Alberta Livestock Meat Agency. Rubber flooring used in this research was donated by EasyFix Rubber Products of Ireland. Strategic program funding to the Prairie Swine Centre was provided by Sask Pork, Alberta Pork, Manitoba Pork Council, and the Saskatchewan Agricultural Development Fund.