

Injury Prevention is Loss Prevention: Applying Health and Safety Research Helps the Bottom Line

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Injury as a source of loss

Injury is a big problem in pork production, from a business perspective, a regulatory compliance perspective, and for workers' quality of life. In agriculture, musculoskeletal disorders like back or shoulder pain are the most common cause of work absence, and farm income is lower when operators have disability related to these disorders. In heavy industries like construction, productivity is lower among workers who have pain even when workers do not take time off or make a claim. A survey of Saskatchewan pig barn workers conducted in 2012 found that 92% have pain somewhere in their body, and 58% say their work is affected by pain. Clearly there are opportunities for improving profitability by addressing workplace injury and musculoskeletal symptoms.

Injury prevention is fundamentally linked to sound business practice. Consider the simplest calculation for assessing the viability of a business: **Profit = Revenue – Loss**

The swine industry invests a lot of effort and attention in tracking production performance. But at the end of the day, profit increases the most when there is focus on both production and loss prevention. Loss can come from elevated workers' compensation rates, sick leave and absenteeism, worker turnover (along with the recruitment and training costs this entails), and 'presenteeism' (i.e. workers that have pain but still come to work with lower productivity). Musculoskeletal injury will increase all of these types of loss.

Solving the problem

Knowing about this source of loss is one thing, but how can it be prevented? Researchers at the Prairie Swine Centre and Canadian Centre

for Health and Safety in Agriculture are working on a set of research studies to tackle the issue of injuries in pork production. This research will span 3 main areas: 1) analyzing injury rates to look for trends and target areas; 2) developing a 'toolbox' approach to evaluate the impact of new technologies, and 3) looking for new technologies to test and barns in which to test them.

Analyzing injury statistics

One of the ways to improve performance is to track quantify where you are and set goals for where you'd like to be. Analyzing injury rates will help to do this by setting the current benchmark and then identifying and prioritizing the areas to improve. This type of analysis will also help identify the high risk areas, activities, and job titles. There is already some valuable information from existing reports, since previous ergonomic studies have identified several challenging tasks in pig barns. One article cites catching and lifting piglets as the hardest job, while another reports cleaning, piglet processing, and sorting piglets as having the highest exertion levels. Danish researchers measured duration of back bending and found that in most tasks workers had their backs bent more than >20 degrees for about 40% of the time. In a recent survey of Saskatchewan pig barn workers, the tasks identified by workers as difficult were: moving pig, getting in and out of pens, handling dead pigs, processing piglets, veterinary treatments, cleaning and maintenance. We plan to study modern Saskatchewan injury reports in order to find the biggest opportunities for improvement.



Testing the solutions

After we determine what areas need to be addressed, we'll want to make sure that our proposed solutions are effective. These solutions need to be not only effective in preventing injury, but also acceptable to workers (so that they are used). They also need to provide a good return on investment (so that they get purchased in the first place). In order to make sure these requirements are met within the context of pork production, we need a set of tests or evaluations for new solutions. This 'toolbox' approach will develop a suite of evaluation tools that can be applied to any type of safety solution. The toolbox will assess: the baseline effectiveness of the solution

in preventing injury; the cost of implementation including training and maintenance; acceptability to workers and worker recommendations for improvement; local barn or company characteristics that help or hinder effective implementation; and overall return on investment relative to any changes in injury or productivity.

With good benchmarking and adoption of proven prevention strategies, injury losses can be prevented to strengthen the bottom line

On the lookout for new solutions and test facilities

Lab tests are fine for some things, but to make sure these solutions can be applied successfully in industry we need to assess them in a real-world setting. This means we'll be on the lookout for appropriate solutions to the problems we identify, and also the right environments in which to test them. For example, our first solution to assess will be needle-less injectors.

Needle-less injectors have been gaining popularity on pig farms for productivity reasons. They eliminate risk of needle-stick injury, but may increase musculoskeletal exposures and lead to injury. It is unclear whether needle-less injectors have a net health and safety benefit. This project aims to address that gap with a comprehensive evaluation, including investigation of: Injury rates, Worker preferences, Measured musculoskeletal exposures like grip force and repetition, Productivity, and Overall cost-benefit and return on investment. This means we'll be implementing the needle-less injectors in a few barns and observing the effect on worker


symptoms and productivity. We'll also meet with workers and barn managers to identify challenges and find the best ways to make the transition smooth. Lastly, we'll track the costs and weigh them with the potential benefits so that producers can make an informed choice about when to adopt a new method or technology.

We know from previous research that there are some things that can be done to maximize the chance for success when introducing a new method. New controls are generally more successful when they have:

1. Organizational support and involvement at the top, where management not only says safety is important, but shows it by ensuring the time, funding, and resources are available to make the control successful.
2. Safety included as a business priority, demonstrated by incident tracking and OH&S systems, including safety in performance evaluations, and preventing loss by helping low performers
3. A local champion — perhaps a worker representative or manager who is already engaged in Occupational Health and Safety issues.
4. Engaging workers throughout the process to address constraints and motivate buy-in.
5. Adequate communication of the project's goal, what will be done, timeline, and ways to give feedback.
6. Some pilot testing. Trial small before you go big, trial cheap (i.e. get feedback on the paper version) before you go expensive, and evaluate any new initiative before expanding the implementation.
7. Training reinforcement to encourage peer and supervisor modeling.

Moving forward

Injuries can take a bite out of profits, but they don't have to. With good benchmarking and adoption of proven prevention strategies, injury losses can be prevented to strengthen the bottom line and secure long-term viability. The number of options in potential solutions can be overwhelming, but a systematic and collaborative effort will help identify the good ones. Ongoing research is being conducted to test potential strategies, and will be communicated to producers via the Prairie Swine Centre.

Collaboration and participation from producers is vital to developing solutions that are going to work in the long-term, so we'd love to hear from you. Please feel free to contact us if you have an idea for a new safety solution, or if you are interested in participating in a barn trial. 

(Nanotechnology)..Continued from page 4) chambers' ventilation air recirculation systems – one loaded with nanoparticles and the other without. The trials were 15 days long, and the scientists monitored microbial loads both in the air and on surfaces, as well as greenhouse gases, manure characteristics and pig performance.

To measure whether the nanoparticles could help with sanitation, two levels of ZnO nanoparticles were sprayed on concrete surfaces and compared to the control, which was treated with the standard chemical treatment ordinarily applied.

The results from both phases of the experiment were encouraging.

"Partial filtration of the air in the chamber with the ZnO nanoparticles did achieve a reduction in bioaerosol levels in both the human and the animal-occupied zones," said Predicala, adding it was important to note that the nanoparticles didn't appear to negatively affect any other measured aspects of swine production. "There was no significant impact on carbon dioxide and methane emissions, manure characteristics, or pig productivity."

The ZnO particles were shown to be effective in controlling the growth of certain commonly encountered pathogens such as Salmonella and S. suis. Also, the filtration system could be improved, further reducing bioaerosol pathogens with better air capture, and forcing more air to pass through the treated filter.

The sanitation experiment showed that the nanoparticles can indeed make a big difference by inhibiting the growth of microorganisms and in fact, could be a better option than conventional disinfectants. Of course, new technologies not only have to work, they have to be reasonably priced in order for any potential implementation to make sense. In that regard, the sanitation nanotechnology was ahead of the filter application.

"Currently, the use of the nanoparticle solution during sanitation was only about 12 cents higher than the use of conventional disinfectant," explained Predicala. "The cost of filtration treatment with ZnO nanoparticles has to come down significantly before it can be a practical barn application.

Predicala and Alvarado recommend pilot-scale testing in other parts of the barn such as the nursery, breeding, gestation, and farrowing areas to further determine the feasibility of both the sanitation and the filter nanoparticle applications.

"It would also be useful to conduct trials at higher recirculation rates, which would likely have a better impact on reducing bioaerosol levels," said Alvarado.

The full version of the study report can be found at prairieswine.com. 