The Heat is On: Truck Wash System Dissolves Disease

By Geoff Geddes, for Swine Innovation Porc

Better; faster; cheaper. In any recipe to disable pig pathogens like PED, those are key ingredients for industry. No wonder there's so much interest in what researchers are cooking up to improve the cleaning of livestock transport trailers.

"Now that most farms have biosecurity perfected, we need to focus on the greatest vector for disease transfer, which is trucks," said Associate Professor Terry Fonstad with the College of Engineering - Department of Civil, Geological and Environmental Engineering at the University of Saskatchewan.

As any producer knows, cleaning trucks is costly and expensive, requiring 6-8 hours at $100 per hour. Even at that, disease often falls through the cracks. So Fonstad and his team – including the Prairie Agricultural Machinery Institute (PAMI), VIDO InterVac and the Prairie Swine Center (PSC) - went in search of a slick solution and found it in a fitting spot: the oil patch.

"There's a hydrovac system used for vacuuming contaminants when boring holes. It's a high-pressure unit that blasts holes through soil and it begged the question: Why not use it for cleaning trucks?"

Trailer wash facility. Source: Prairie Agricultural Machinery Institute

Above: condition of trailer floor after flood wash. Below: truck wash equipment. Source: Prairie Agricultural Machinery Institute

In adapting the approach for the hog industry, researchers ran trials on factors like velocity and hose size and worked on automating the system to make it user-friendly. Also, to ensure that all dangerous pathogens are deactivated, they spoke to veterinarians and conducted literature reviews around the best means for killing swine pathogens.

Turning up the heat

"We learned that all major swine viruses seem susceptible to dry heating at elevated temperatures, and that was the 'a-ha' moment for us.

Industry was already drying trucks at 45°C, and our testing showed that 70°C for 15 minutes – or 75°C for PED - would kill all pathogens."

Within a few minutes of presenting these findings, they had industry leaders texting their facilities to crank up the heat. Of course, like everything in the hog industry, there are no simple solutions here, which is why the researchers went one step further.

"We then sent a grad student out to measure temperatures in different areas of the truck so we could gauge the impact when a bit of water or lump of dirt is left behind after washing. This highlighted the necessity of heating every part of the trailer to 75°C for 15 minutes. That way, if something carrying disease falls out from behind a light or is jammed between layers, it will still be deactivated."

Sucking up data

As for the vacuum system, Fonstad stresses the need for automation such as a track robot to handle the 50-foot hose.

While the baking approach of higher heat is already being implemented in some truck washes, work on the vacuum apparatus is still ongoing, and for good reason.

"The vacuum prototype is being tested, but the next step is an expensive one. Before putting millions into implementation, we will continue tweaking and testing until next spring when we're holding a demo day for industry partners to make some decisions."

Since the devil is always in the details, those working the project plan to proceed cautiously now that they have proof of concept. Still, Fonstad has one eye on the big picture, and he likes what he sees.

"This represents a paradigm shift in how we transport animals and maximize welfare and efficiency. Our current focus is on the hog industry, but the system could have applications for cattle, chicken and even vegetables."

For producers and industry partners, it comes down to saving time, money and energy. And if that's not a recipe for success, what is?

Pressure wash with vacuum (left) compared to dry vacuum only (right) . Source: Prairie Agricultural Machinery Institute

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