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Pig Trailer Design 101

Challenges in Designing a Swine Transport Trailer

When developing an entirely new system for animal transport, there are bound to be certain design challenges. Through the *Improving the biosecurity and welfare of animals during transportation* project, the research team at the Prairie Swine Centre is currently working to improve the initial prototype trailer in order to address emerging concerns regarding biosecurity risks and animal welfare pressures.

Biosecurity

The prevalence of swine diseases has always been a challenge for the industry. For example, airborne transmissible diseases such as the Porcine Reproductive and Respiratory Syndrome (PRRS) is pandemic and causes reproductive failure in breeding stock and respiratory tract illness in young pigs (Pig Care 2022). Resulting economic losses are significant, estimated to be around \$100 million per year in Canada due to PRRS alone. More recently, new serious concerns have arisen due to the emergence of the Porcine Epidemic Diarrhea (PED). This disease has decimated the U.S. pig industry because it causes high mortality rates in infected animals (up to 100% in piglets, SHO 2022). PED has now found its way into the Canadian industry, with contaminated transport trailers identified as one of the main routes for bringing the disease into farms. This brought new stringent biosecurity requirements for thorough cleaning and complete disinfection of all transport trailers. Although strict protocols for trailer cleaning have been developed, the biggest improvement can be achieved by integrating features that enhance cleanability and washability into the design of the trailer. Physical design is important in order to minimize corners and hard-to-clean spots for improved and faster cleaning and disinfection.

These cleanliness requirements have also brought about other challenges, mainly regarding the robustness of any equipment installed in the trailer. Cleaning and disinfection protocols often call for harsh chemicals, pressurized water spraying and high temperatures used for drying. These conditions are particularly destructive for sensors requiring specialized resilient models. Protections are also necessary on permanent sensors while more sensitive pieces of equipment can be designed to be easily detachable.



Animal Welfare

Public pressure for enhanced animal welfare in food production has increased significantly, further amplified by recent high-profile cases involving animals during transport. Transport-related animal welfare concerns include the possibility of animals experiencing stress, fatigue, injury, morbidity, and even mortality. Hence, current trailer designs must incorporate features such as better accessibility and control of thermal conditions as well as provisions for drinking water and feed, to ensure that animal welfare is not compromised during transport.

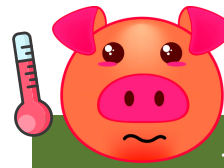
Accessibility

Loading and unloading of animals are particularly stressful activities. Competent staff is essential, but properly designed equipment can also help. For example, pigs can't handle steep ramps (no more than 20°) or high steps (25 cm maximum). In fact, eliminating ramps and steps altogether as well as limiting visual distractions would allow for easier movement of pigs (NFACC 2014).

Many features and modifications were incorporated in the new prototype trailer to overcome these design challenges. The next step in the project is to carry out a series of road and disease challenge tests to make sure the transport trailer functions as intended.

References

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Thermal Environment

Although several factors during transport induce stress, it is the thermal micro-environment within the transport vehicle that poses the greatest risk to the animals' well-being and is a leading cause of death during transit. As pigs have little hair and don't sweat, they have a narrow thermal comfort zone (10 to 24°C) and they are very sensitive to extreme temperatures, both cold and hot (Rioja-Lang et al. 2019). Properly monitored and controlled mechanical ventilation combined with a mister system would greatly improve environmental conditions in transport trailers.

Sustenance

Animal transport trailers typically just consist of a metal box without many amenities. Installing the appropriate drinking and feeding equipment in trailers may help improve pig welfare, especially on longer trips.



For contact information, please visit www.agrivita.ca

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