



CANFARMSAFE™

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Testing the New Swine Transport Trailer Part 1 - Road Tests

The aerosol transmission of airborne swine pathogens is a serious concern to the pig industry as disease outbreaks can result in devastating economic losses. Pig producers have installed air filtration systems to protect the animals inside the barn, but the biosecurity protection ends once they are taken out from the facility, especially during transport through pig-dense areas with known endemic diseases. A prototype livestock trailer (Figure 1) was developed by the research team leading the *Improving the biosecurity and welfare of animals during transportation* project. The trailer is fitted with an air filtration system and has integrated environmental control systems (ventilation, heating, and misting) in response to public demand for enhanced animal welfare. To assess the performance of the trailer in maintaining a pathogen-free and welfare-friendly environment for the pigs during transport, a series of road and disease-challenge tests will be conducted under a wide range of conditions. The preliminary tests have just been completed and the results will be presented in a two-part series beginning with the road tests.



Figure 1: Prototype livestock trailer



Figure 2: Two-deck animal compartment

Objective and Methodology

The objective of the road tests is to evaluate the following parameters under summer and winter conditions:

1. The performance of the installed ancillary systems (ventilation, heating, misting systems) to maintain the optimum thermal and air quality environment for the pigs.
2. The functionality of the sensors and devices to monitor and record real-time conditions inside the trailer.
3. The general welfare of the animals during transport.

Based on the minimum space allowance of 0.15 m² / 25-kg pig specified in the Transport Code, 40 pigs can be loaded on each deck of the trailer. To minimize the total number of animals used, only one of the 2 decks of the trailer will be loaded since the 2 decks are thermally isolated. Prior to each road test, the pigs sourced from a disease-negative barn will be checked for fitness and all sensors and devices (Figure 3) will be activated.

Results

As shown in Figures 4 and 5, the target environmental conditions were maintained in the animal compartment even with the large difference in recorded temperature between air inlet and animal compartment. It should be noted that the temperature in the front, middle, and rear compartment all followed the same trend, indicating that the spatial factor was insignificant and that the installed fans, heaters, and wall insulation were working as expected. However, a slight drop in exhaust air temperature was observed between 8 to 11 a.m. This was attributed to extreme gustiness of wind blowing against the exhaust. The recorded drop in temperature during the unloading period was due to opening of the back door, allowing cold outside air to enter the animal compartment.

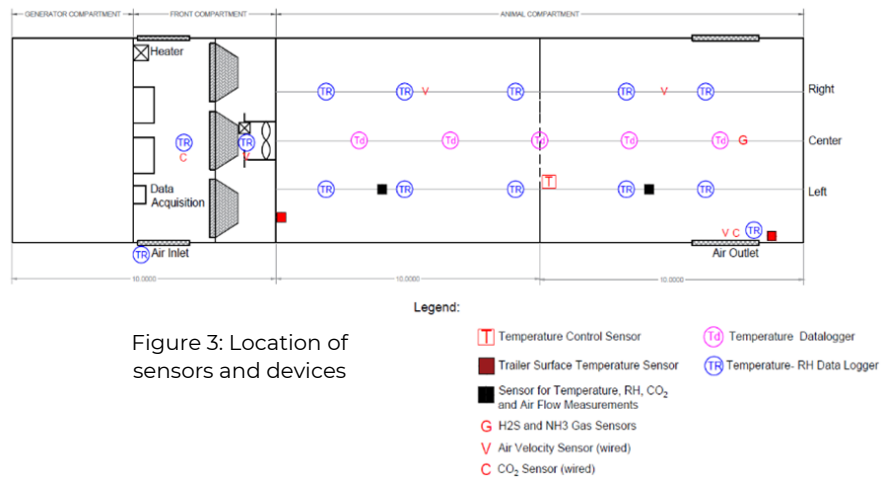


Figure 3: Location of sensors and devices

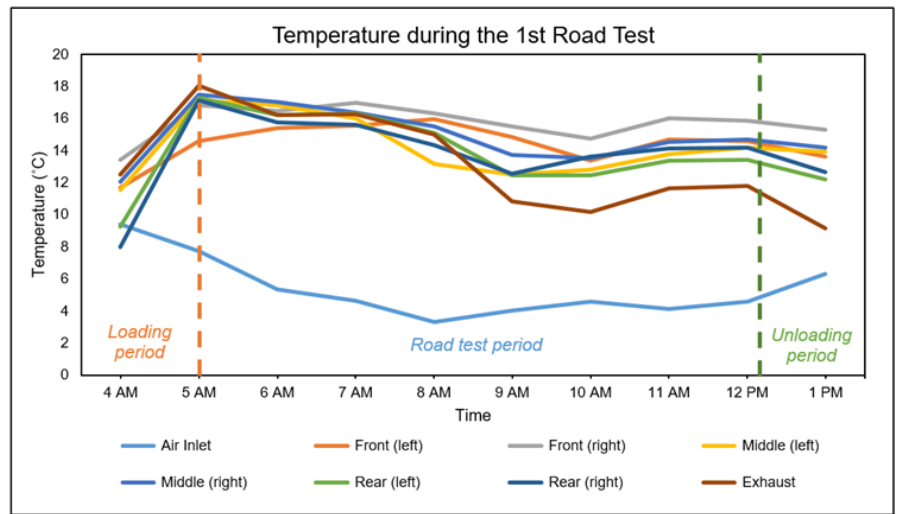
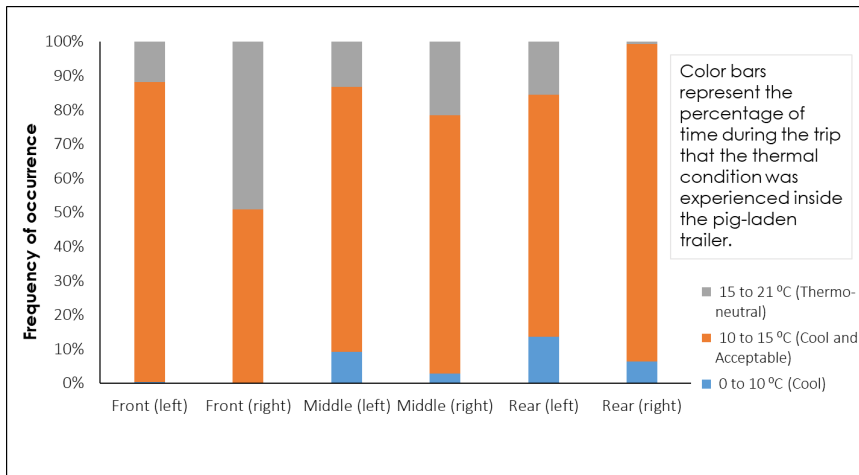


Figure 4: Trailer temperature time series

Figure 5: Thermal comfort classification



This first road test showed that the trailer's systems were capable of maintaining acceptable environmental conditions in the animal compartment throughout the entire duration of the transport. At the end of the road trip, 30 pigs (out of 40) were unloaded, while the remaining 10 pigs were retained for the disease-challenge test.