

Investigation of strategies to mitigate accelerated deterioration of pig buildings

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Overview

Swine building environments, especially during harsh Canadian winters, can be very destructive to barn infrastructure (i.e., walls, eaves, ceiling, attic, plenum, etc.). Varying thermal conditions, high levels of moisture and corrosive gases such as hydrogen sulfide and ammonia, the presence of dust and microorganisms causing decay are all possible destructive factors that make swine barns highly susceptible to accelerated deterioration. Therefore, producers are looking for ways to address these issues to extend the life of their barns, and to avoid doing costly renovations every few years to keep the barns in operation.

This project was formulated to gather and identify potential solutions applicable to Canadian conditions to mitigate the accelerated deterioration of swine buildings. To achieve this, a literature review and an information survey will be carried out. A compiled list of potential solutions will then be assessed based on overall effectiveness, cost, and suitability for application in Canadian swine barns.

Highlights

About 35 relevant published scientific papers, technical bulletins and handbooks have been compiled and reviewed so far. It has been learned that timber (wood), concrete, and steel (metal) are the most commonly used materials found in agricultural building structures. The degradation of wood structures is mainly caused by either biotic agents or external abiotic factors. Biotic agents include fungi, bacteria and insects while external abiotic factors may include solar radiation, wetting and drying by precipitation, changes in relative humidity and

temperature, abrasion from windblown particulates, atmospheric pollution, and human activities such as application of chemicals for cleaning, sanding and power washing, among others. Metal structural components naturally corrode over time due to a process known as electrochemical oxidation; however, the rate of corrosion tends to accelerate due to prolonged exposure to corrosive agents in farm buildings. The rate of corrosion is influenced by high humidity levels and the presence of different microorganisms that produces aggressive metabolites such as aerobic, anaerobic and sulphate-reducing bacteria. The information on the types of structural members commonly used in barn infrastructures and their respective causes of rapid deterioration will be used to identify potential strategies/measures to address the issues associated with rapid building deterioration.

The project is ongoing and results should be available around the beginning of 2018.

Implications for the swine industry

A list of promising solutions to rapid barn deterioration and their applicability to Canadian swine barns will be provided. This will help producers to extend the useful life of their barns and avoid costly recurring renovations.

Collaborators

Sébastien Turcotte Centre de développement du porc du Québec