

Impact of amended feedlot pen surface on cattle health and welfare, environmental and economic sustainability

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Feedlot pen floors in Alberta are traditionally constructed of compacted clay. Annual feedlot pen maintenance requires sourcing and excavating clay to repair damaged pen floors, which significantly adds to the input costs and environmental footprint of cattle feedlots in the province. Constructing feedlot pen floors with fly ash-amended concrete, in this case, roller compacted concrete (RCC), has been suggested as one possible sustainable solution for stabilizing the pen floors, and subsequently improving efficiencies of feedlot operations and animal performance, among other potential benefits.

Research is underway at a commercial feedlot operation in southern Alberta where some of the traditional clay floor pens have been retrofitted to RCC floors. Funding to conduct the research project was provided by Government of Alberta. The project commenced in February 2016 and is anticipated to be completed by February 2019.

This research project aims to assess the social, environmental, technological and economic performance (positive, negative or neutral) associated with housing feedlot cattle in RCC floor pens versus traditional clay floor pens.

The primary objective of the project is to assess the following sustainability indicators:

- Social: Cattle Health and Welfare - lameness rates; mud scores; and physiological and behavioral indicators of cattle welfare
- Environmental: Water - runoff volume and water quality (contaminants); Air - ammonia emissions; Climate Change - greenhouse gas emissions; Soil - pen soil quality (contaminant levels); Manure - volume at cleanout and quality (composition and contaminant levels)
- Technological: RCC - compressive strength, floor thickness, density, durability and potential mobility of heavy metals introduced via the use of fly ash in the RCC
- Economic: Cattle - average daily gain and tag scores; Manure - handling costs; Clay - handling costs and pen floor maintenance costs; RCC - construction costs and maintenance costs