

Title Mathematical modelling the stored-grains ecosystem.
Authors Chen, L.
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Abstract

Global competition is forcing organizations that store grains to become ever more efficient. Capital and running costs associated with storing grains must be reduced, while key indicators of grain quality must be met. Mathematical models of the stored-grain ecosystem have now reached a sufficiently high degree of sophistication to be used with increasing confidence in specifying the design and operation of grain stores. In this paper, a finite-volume model of a farm silo fitted with a conical base is formulated and the resulting discretized equations are solved explicitly. Modelled results compare very well with experimental results obtained from an aerated silo containing canola at Wongan Hills in Western Australia. Limitations of the model are that more accurate methods of estimating the temperatures of the surfaces of the silos must be used, and buoyancy-driven flows in the grains and the headspace must be considered.