

Evaluation of Australian sealed silo technology under U.S. conditions

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Abstract

Sealed grain storage is a proven technology in Australia that helps ensure successful grain fumigations and prevents insect resistance from developing. However, further research is needed to optimize its design and expand its implementation. Assessment of an Australian sealed silo and a U.S. silo sealed after market was undertaken to evaluate sealed silo performance under U.S. conditions. The sealability of the silos were verified with the Australian Standard 2628 five-minute half-life pressure test. Fumigation trials are being carried out with phosphine pellets, cylindered phosphine, and cylindered sulfuryl fluoride; and are being evaluated by gas monitoring lines and insect bioassays. Each fumigation approach is studied with thermosiphon recirculation, closed loop fan-assisted recirculation, and without recirculation. In addition, a validation study of the KSU 3D ecosystem model will be performed to facilitate scaling-up of thermosiphon recirculation in larger grain silos.

Keywords: sealed grain storage, fumigation, phosphine, sulfuryl fluoride, thermosiphon recirculation