

Project Number & Title: 4B-124: Re-engineering of grain grinding/sieving in commercial mills and application of software

Project Leader: Robert Parkes

Project Participants: Ridley, Rivalea, SunPork

Aims and Objectives: This project comprised two parts: (i) a desktop study of options available and cost/benefit analyses for four stock feed plants in Victoria, NSW & South Australia and (ii) evaluation of software and algorithms arising from two integrated projects through University of Queensland.

Key Findings

It has been identified that (a) thorough engineering reviews at selected commercial feed mills illustrate that reengineering the grinding capabilities of commercial feed mills is largely cost prohibitive. This is based on individual mill setups and by species feed supply mix requirements and also the mill down time that would be needed to make the necessary changes; (b) robust monitoring of feed mill grinding capabilities and establishing standards that reduce/minimize grain particle above 1mm for creep through grower feed are achievable in feed mills; (c) the application of project 4B-123 threshold particle size calculator has merit as a particle size and energy grain availability monitoring tool for feed mills, and (d) further work to establish a sieving protocol using 9-10 sieves and selection of the curve of best fit is required.

Application to Industry

This project has identified alternatives to retrofit conventional feed mills to better manage grain and feed particle size. In all circumstances, the costs of completing this work are considerable and for alternative options such as replacing grinding equipment, are cost prohibitive from both an equipment (capital) and mill down time for the work to be completed. The cost benefit analysis for the mills included in this project also relates to the volume of pig feed manufactured and the volume of alternative species feeds manufactured. Each mill included in the project are best placed to complete this assessment.

Completing the review of particle size identified that there is benefit to the pig industry through feed suppliers or home mixers being able to better manage particle size depending on the stage of pig production. The reduction in energy available to the pig ranged from 1 - 12% depending on the type of grinder and distribution of particles above 1000 microns. At this higher end of this range (where many samples sit) there is potential to halve the reduction in energy through reducing the quantity of large particle above 1mm. Factoring in a reduction from 10% to 5% improves energy availability from the grain component of creep through grower feeds by 0.60 to 0.70 MJ of DE.

Further, the variation in grinding results from this analysis identifies that from the same grinding equipment, operations management (grinder set up and monitoring) strategies can substantially influence the level of energy reduction. Do feed mills need to change equipment, add in additional sieving or adjust current equipment to better manage grain or feed particle size? The results from the ground grain analysis indicates that grinding equipment set up and monitoring provide the quickest and most cost effective method for improving pig performance. Feed manufacture is a specialized skill and should be considered a technical aspect of all pig production systems be they internal or external suppliers. Pig producers are encouraged to have a close working relationship with their feed supplier or look more closely at their own grinding systems set up and monitoring if they home mix their feed.