

Abstract Submitted
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The Effect of Grain Shape on Confined Granular Flows SALEM WRIGHT, ELLEN D'AMICO, ELI OWENS, Presbyterian College — Granular materials are collections of macroscopic particles, such as corn, rice, and peas. Grain silos store granular particles and are subjected to irregular force build-up, which can have catastrophic results. It has long been observed that the pressure at the bottom of a silo is screened as the silo is filled. We studied the force build-up on the side-walls of grain silos from materials of different aspect ratios, specifically corn, peas, and rice. The model silo used in the experiment was constructed out of sheet metal pipe 120 cm in length and 15 cm in diameter held in place by a frame constructed of 80/20 aluminum. Four force sensors were evenly spaced vertically at the bottom of the silo and used disks of sheet metal approximately 2.5 cm in diameter screwed into the sensors internal load cells to evenly distribute the applied force. The fill height was approximately 100 cm from the bottom of the silo. Our work found that rice exhibited more irregular force build-up than peas and corn. This work will allow us to better understand the behavior of confined granular flows with respect to grain shape and will provide insight into design methods for grain silos, as well as assist with understanding grain shapes effect on natural phenomena like avalanches.

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