

Abstract Submitted
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Granular Flow into Model Grain Silos ELI OWENS, JAMES SATERFIELD, Presbyterian College — It has long been observed that the pressure at the bottom of a granular container, for instance a grain silo, saturates as the height of the container increases relative to its width. However, the precise effect grain shape has on the buildup of sidewall pressure is not well understood. Using a model silo, we investigated the influence of grain shape on sidewall pressure during the filling process. Our silo is 125 cm tall and 16 cm in diameter and is filled with either corn or peas via a cone shaped hopper. This hopper has a lower opening 4 cm in diameter and fills the silo at a constant rate. As the silo fills, we monitor the pressure the grains exert on a 7 cm² section of the wall. We see that the corn and the peas behave differently. When using the corn, the pressure reaches a peak value and then decays with time. We attribute this decay to the irregular shape of the corn which causes grains higher in the silo to jam and shield the lower grains from the weight above. However, this decay is not as pronounced when using the peas. Since the peas are round, they can more easily rearrange than the irregular corn particles and are not as effective at screening the pressure.

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