

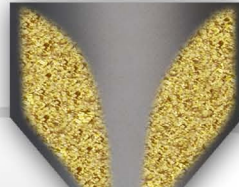
Historical Problems

Bin Flow

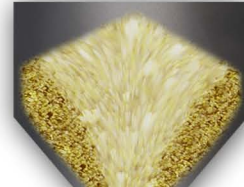
For decades process engineers and maintenance personnel have struggled with three common material flow problems:



Bridging



Ratholing



Funnel Flow

Why? Incorrect understanding and design of hoppers, bins and discharge devices for a particular bulk solid.

Historical Solutions

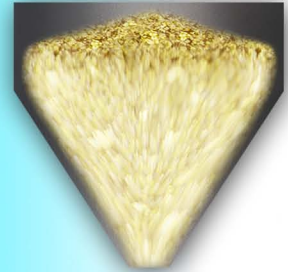
Brute Force

In the past these problems have mainly been addressed with Brute Force. Vibrators, Air Cannons, Internal Agitators and Horsepower have all been applied to promote material flow. In some cases these solutions have worked. In some cases they have created more or different problems. In other cases they have failed completely.

The Solution

Mass Flow

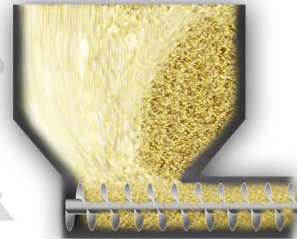
Mass Flow is generally used to describe a material flow pattern, within a hopper, in which all material in the bin flows at the same time, regardless if the material is against the walls or in the center of the bin. It is often used to describe a first in, first out condition.



Historical Problems

Screw Feeders

A bin designed for mass flow becomes ineffective when a standard feed screw is used at the outlet, as this screw always pulls from the back to the front of the feeder, thereby creating a funnel flow condition. This stagnant area can cause many problems including material degradation, segregation, moisture absorption and sanitary issues which can result in an unusable product.

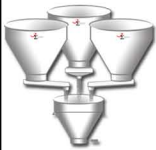


The Solution

Mass Flow Feeders

In the scope of bulk material feeding, the feeder becomes the second, equally critical component to a Mass Flow solution. The feeder must be able to maintain the mass flow pattern developed in the bin. Activation of the entire hopper outlet is required to provide a true mass flow condition.

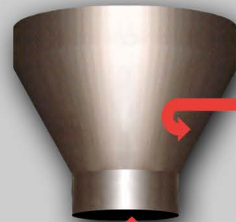




GeoMate™ Design Issues

The key to a Mass Flow Feeding System is applying proper geometric hopper and feeder designs to each bulk solid to attain mass flow. With either component missing, mass flow cannot be achieved in a feeding system. Correct geometric design requires a proper understanding of the product, bin and feeder.

MassMate™ Design Factors



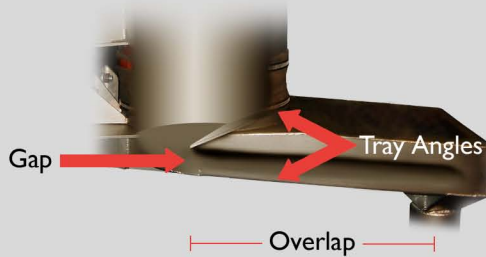
Bin Wall Angles

Greater than the product's wall friction angle

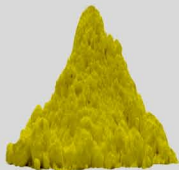
Bin Outlet Diameter

Larger than the product's arching dimension

GeoTray™ Design Factors

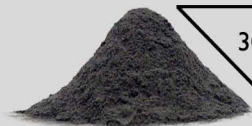


Angle of Repose



60-90°

Adhesive, Cohesive Powders



30-59°

Powders



<30°

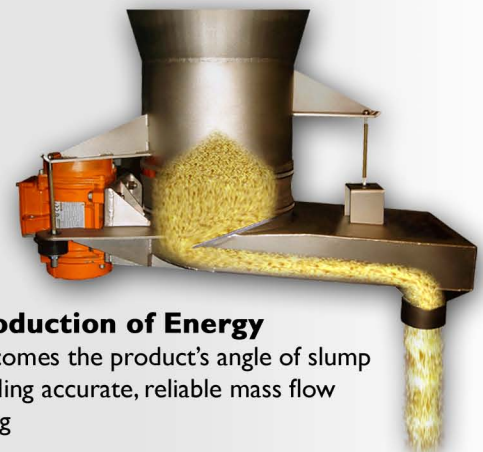
Granules, Pellets,

GeoMate™ Operation



Material at Rest

Takes its angle of repose, sealing itself in the GeoTray™



Introduction of Energy

Overcomes the product's angle of slump providing accurate, reliable mass flow feeding