

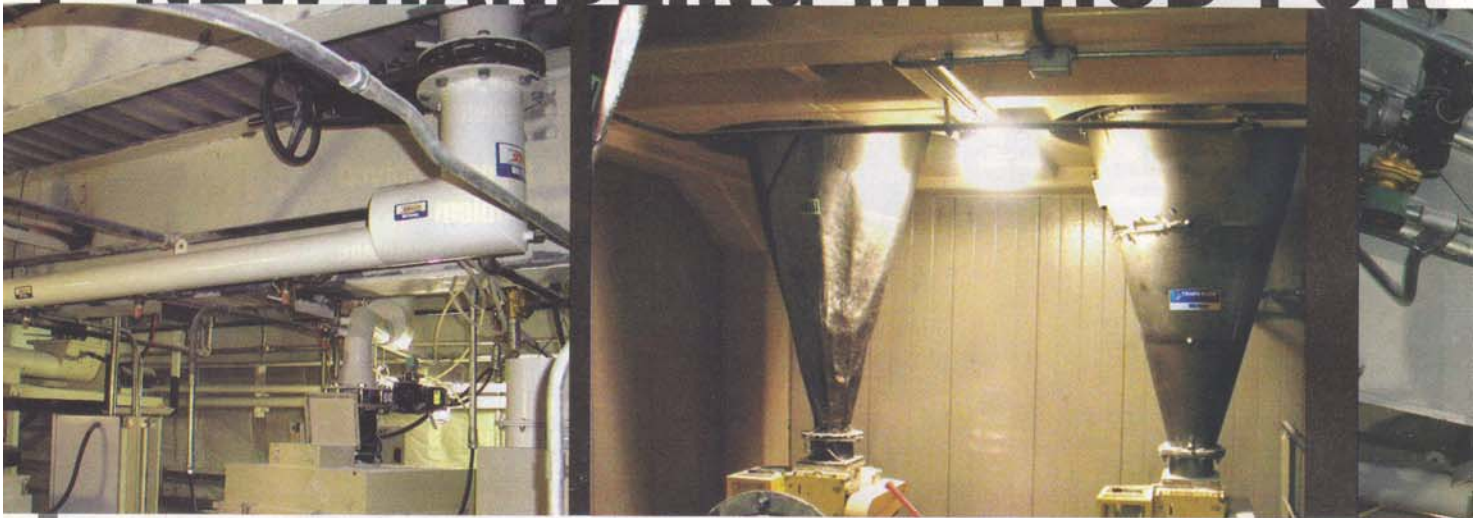
Taking a new look at an old dilemma

The Young Industries, Inc., Muncy, Penn., has more than 55 years of experience engineering and manufacturing dry bulk materials handling equipment. For as many years as the industry of moving cohesive powders and pigments has existed, there has been a need to move them in a more effective and efficient manner. Conventional dilute and dense phase pneumatic systems, screw conveyors, screw feeders, even simple gravity drops have been tried, but with limited success due to material build-up and eventual plugging. Companies

providing a number of beneficial effects on the cohesive material when it is stored in bulk or moved from point to point in the process.

The new system distributes air flow evenly across the powder/material interface surface, thus reducing the tendency of materials toward spouting and subsequent loss of effective fluidizing air flow. For example, this process provides a substantially reduced external angle of friction of the stored material against a silo or hopper cone surface. This significantly reduces the hopper wall

NEW HANDLING METHOD FOR



that use cohesive powders and pigments in their processes have had to resort to some fairly drastic means to get these materials to flow.

Times change, and so does technology

The Young Industries developed new technologies to solve the following problems: Materials had to move from one point to another as efficiently as possible without build-up and plugging. That meant a new way had to be developed to deal with the effects of cohesive powders in the handling process. But, most importantly, the equipment had to be flexible enough to be incorporated into many different industry applications.

Finding the right solution for the problems

After years of research and development, a new fluidizing system called Trans-Flow® was created. Its application to hoppers, downspouts, conveyors, feeders, and various other equipment made handling cohesive and difficult powder materials practical. This new fluidizing system enables the handling of cohesive powders by

angle required for mass flow within the hopper or silo.

Local agitation of the powder at the wall surface is also achieved, preventing build-up of thick layers. By fluidizing the powder, the new system greatly reduces the internal friction angle of the stored material. This allows the powder to freely discharge from openings as small as 4" in diameter, as opposed to other mass-flow designs which may require outlet diameters exceeding 6" in size for reliable gravity discharge.

The process also supplies the air or gas required to expand the stored material from its consolidated, at-rest state to its fluidized, free-flowing state. This eliminates flow blockage at the hopper outlet caused by the inrush of air required for product expansion. This new process also conditions the materials to help increase packout rates and assist with material settling in the receiving container.

Hoppers are only part of the required material handling equation for cohesive powders. Attempting to handle cohesive powders, no matter how well conditioned at the hopper discharge, was still nearly impossi-

ble in conventional conveying equipment. A means of moving or metering the discharged material a usable distance away from the hopper or silo was now required.

Moving hard to handle cohesive products

A customer request required the feeding of a sluggish, cohesive powder into a large vessel. The project dilemma was how to move the material from the containers it was stored in to the receiving vessel as quickly and

0.05 percent of the infed material. The system was also found to possess other advantages as well. The type, weight or cohesiveness of the material had little effect on the operational efficiency of the unit. For example, by adjusting the fluidizing gas flow when using a nominal 3-inch-diameter unit, the conveying rate can be turned down from a strong solid 15,000 pounds-per-hour stream to a veritable trickle.

COHESIVE POWDERS, PIGMENTS



efficiently as possible. Engineers determined that because the system worked so effectively in the hopper design, it could be incorporated into a discharge design as well. The new piece of equipment is called the STINGER™ and has the ability to produce the same fluidizing characteristics that the hopper application displays.

With the new unit mounted under a lined hopper and attached to the hopper outlet opening, the results were immediately apparent. A nominal 3-inch-diameter unit was capable of moving the cohesive material out of the lined hopper and into a receiving vessel at 20,000 pounds-per-hour, without any build-up or plugging anywhere in the systems. The resulting discharged powder flow would best be described as a solid and continuous stream of completely fluid powder. The system described uses only 22 scfm of low-pressure air to operate.

Another benefit of the conveying system is a direct result of the low-volume of air required to operate the system. Carryover of dust from the air outlet of the receiving vessel was determined by field test to be only

With these capabilities and the addition of a load cell, the STINGER™ is transformed into an effective, no-moving parts replacement for metering screw feeders. Current installations also show that, even at a maximum discharge rate, instantaneous cessation of flow is achieved when the system is stopped. This allows repeat weighments in a 3" unit of $\pm 1/2$ pound of material flow to be realized.

Further studies show that the unit enabled instantaneous positive flow cutoff for many types of materials with bulk densities ranging from 3 to 80 pounds-per-cubic-foot. Additionally, full flow of any powdered material can be immediately and completely recommenced even with the unit completely packed full of material.

For more information about the STINGER™ for Trans-Flow®, contact The Young Industries, Inc., at 570-546-3165 or email mktinfo@younginds.com.

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