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HOW WEIGHING WILL CHANGE IN 2022

A NORTH COAST MEDIA PUBLICATION

NOVEMBER 2021
VOL. 114 NO. 5

PitandQuarry.com

Engineered vibration supplies energy precisely where it's needed to reduce friction and break up a bulk material to keep it moving.

HOW FLOW AIDS CAN HELP

Innovative solutions are available to resolve some of the most pesky material handling dilemmas

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Transfer chutes and vessels must be designed to not just accommodate – but to actually facilitate – the flow of the cargo they will be handling in order to achieve a controlled, consistent flow on conveyors handling large volumes of bulk material.

Unfortunately, because so many conditions can hamper effective cargo flow, engineering a conveyor and chutework that handles every material situation is virtually impossible.

Even modest changes in moisture content can cause adhesion to chute or vessel walls or agglomeration at low temperatures, especially if a belt is stagnant for any period of time. A bulk material can become compressed even during continuous operation, and physical properties often change due to natural variations in the source deposits, suppliers or specifications – or if the material has been in storage.

If left to build up, material can encapsulate belt cleaners and deposit harmful carryback onto the return side, fouling idlers and pulleys. At worst, systems can become completely blocked by relatively small changes.

To overcome these issues, devices such as flow aids can be employed.

WHAT ARE FLOW AIDS?

As the term implies, flow aids are components or systems installed to promote the transport of materials through a chute or vessel, controlling dust and spillage.

Flow aids come in a variety of forms, including rotary and linear vibrators, high- and low-pressure air cannons and aeration devices. Additionally, low-friction linings and special chute designs promote the efficient flow of bulk materials.

These modular systems can be combined in any number of ways to complement one another and improve performance. The components can be used for virtually any bulk material or environment, including hazardous duty and temperature extremes.

One of the primary advantages of flow aids is operations can obtain a level of control over the material flow that is not possible any other way. When employing flow aids, it's critical that the chute and support components are sound and the flow aid is properly sized and mounted. The operation of these devices can create potentially damaging stress on the structure, but a properly designed and well-maintained chute will not be damaged by the addition of correctly sized and mounted flow aids.

Also, it's important that any flow aid be used only when discharges are open and material can flow as intended. The best practice is to use flow aids as a preventive solution to be controlled by timers or sensors to avoid material buildup, as opposed to waiting until material accumulates and restricts the flow.

Using flow aids in a preventive manner improves safety and saves energy because they can be programmed to run only as needed to control buildup and clogging.

AIR CANNONS

One solution to manage material accumulation in chutes and vessels is the low-pressure air cannon.

Also known as an "air blaster," an air

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cannon uses a plant's compressed air to deliver an abrupt discharge to dislodge buildup. Cannons can be mounted on metallic, concrete, wood or rubber surfaces.

The basic components of an air cannon are an air reservoir, a fast-acting valve with a trigger mechanism and a nozzle to distribute the air in the desired pattern to most effectively clear the accumulation.

The device performs work when compressed air or another inert gas in the tank is suddenly released by the valve and directed through an engineered nozzle, which is strategically positioned in the chute, tower, duct, cyclone or another location. Often installed in a series and precisely sequenced for maximum effect, an air cannon network can be timed to best suit individual process conditions or material characteristics. Air blasts help to break down material accumulations and clear blocked pathways, allowing solids to resume their normal flow.

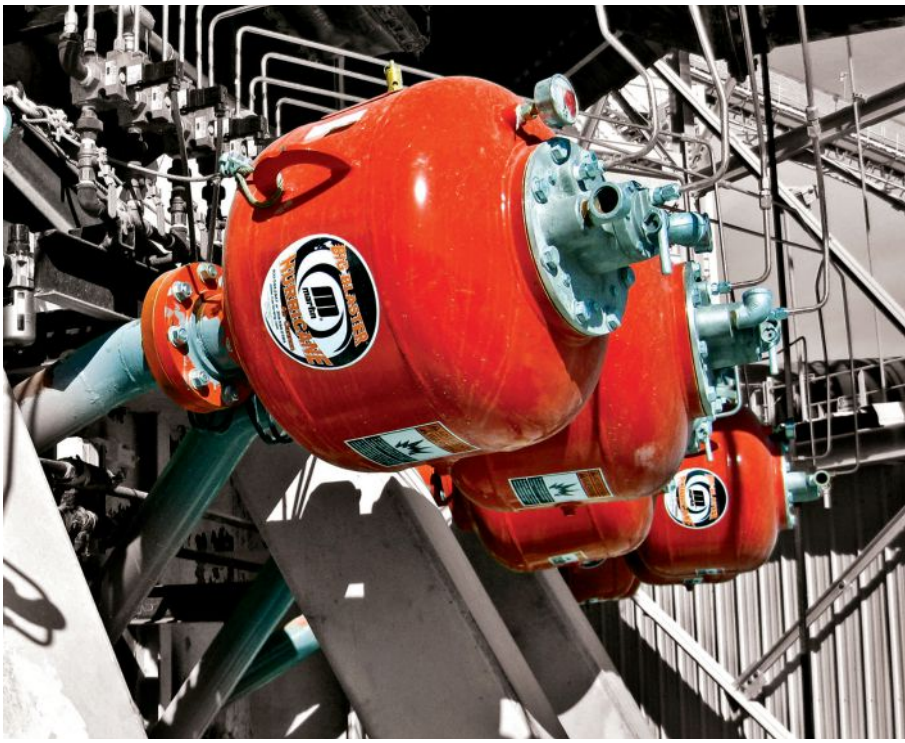
In order to customize an air cannon installation to the service environment, specific air blast characteristics can be achieved by manipulating the operating pressure, tank volume, valve design and nozzle shape.

In the past, when material accumulation problems became an issue, processors had to either limp along until the next scheduled shutdown or endure expensive downtime to install an air cannon network. That arguably cost businesses hundreds of thousands of dollars per day in lost production.

Many designers proactively include mountings in new designs so that a future retrofit can be done without hot work permits or extended downtime. A new technology was even developed for installing air cannons in high-temperature applications without a processing shutdown, allowing specially trained technicians to mount units on furnaces, preheaters, clinker coolers and in other high-temperature locations while production continues uninterrupted.

OTHER FLOW AIDS

An age-old solution for breaking loose blockages and removing accumulations from chutes and storage vessels is to pound the outside of walls with a hammer or another heavy object.



A series of air cannons can be programmed to deliver precisely-timed operation for maximum benefit.

But the more walls are pounded, the worse the situation becomes. The bumps and ridges left in a wall from hammer strikes will form ledges that provide a place for additional material accumulations to start.

A better solution is to use engineered vibration, which supplies energy precisely where needed to reduce friction and break up a bulk material to keep it moving to the discharge opening – without damaging the chute or vessel. The technology is often found on conveyor-loading and discharge chutes, but it can be applied to other process and storage vessels such as silos, bins, hoppers, bunkers, screens, feeders, cyclones and heat exchangers.

Another innovative solution is available to prevent carryback from sticking to the rear slope of a discharge chute. A live-bottom dribble chute uses material disruption to reduce friction and cause tacky sludge and fines to slide down a chute wall and back into the main discharge flow.

TAKEAWAYS

By addressing these issues, operators can experience a reduction in maintenance hours, equipment replacement and downtime, lowering the overall cost of operation.

Flow aids deliver force through a chute or vessel and into the bulk material. Over time, components will wear – or even break – under normal conditions.

Most of the flow aids discussed can be rebuilt to extend their useful life. Because clearances and fits are critical to proper operation, it's recommended that flow aid devices be rebuilt and repaired by the manufacturer, or that the manufacturer specifically train plant maintenance personnel to properly refurbish equipment. **P&Q**

Information for this article courtesy of Martin Engineering.