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CHEMICAL

Retrofit of bag dump station upgrades safety and productivity

ARRMAZ CUSTOM CHEMICALS in the USA produces specialty chemicals for the mining, water treatment, fertilizer, asphalt, and construction industries at its 18 580 m² manufacturing facility. Since its beginning as a phosphate producer in 1967, the company has introduced numerous products and expanded its markets into 70 countries.

In addition to extensive quality control and customer service programs, the company has implemented a "Total Safety Culture" procedure to protect both its employees and the subtropical ecosystem of central Florida. In a number of ways, ArrMaz goes beyond OSHA (US Occupational Safety and Health Administration) and environmental regulations, to the extent of operating the majority of its open air manufacturing facility under a roof to provide safe working conditions while minimizing storm water runoff.

One ArrMaz product is a resin soap called Arr-Muls that is used as an emulsifier in slow-setting asphalt and as an air-entrainment agent in masonry cements. The process uses heat and agitation to dissolve a solid resin into sodium hydroxide or potassium hydroxide to produce an aqueous soap solution.

To move the solid resin, which was purchased in 23 kg sacks, the company originally installed a Flexicon manual bag dump system consisting of a hopper with a dust collector and 6,7 m flexible screw conveyor that discharges into a 22 713 ℓ tank. Each

batch requires 9 090 kg of the resin, which required operators to lift, slit and dump 400 of the sacks.

In late 2008, Flexicon representative Harry Orr suggested that ArrMaz consider a low cost retrofit of its bag dump station to add bulk bag unloading capability. Plant Engineer Hernan Cortes liked the idea of preventing potential injury from repetitive lifting and slitting, and of eliminating the wasted product and handling associated with disposing of 400 empty sacks per batch.

The Flexicon flexible screw conveyor was retained since it is not only well suited for use with a bulk bag discharging station, but also has handled the resin effectively despite the material's tendency to interlock and degrade. The existing dust collection exhaust system was also retained, but moved from above to beside the hopper to allow positioning of bulk bag spouts directly above the hopper.

The new hardware consists of a four-post unloading frame, at the top of which is a cradle with wide receiving cups that support a removable bulk bag lifting frame that is raised and lowered using a forklift, allowing operators to connect full bags and disconnect empty ones at floor level.

A conventional iris valve located atop the existing manual dumping hood prevents material flow from the bulk bag while the bulk bag is being untied and once the bag has been opened, allows controlled discharge of



At top of the unloading frame, Pop-Top™ bag extension devices raise and elongate the bulk bag, promoting flow through the bag spout. At bottom, pneumatically actuated Flow Flexer™ plates raise and lower opposite bottom sides of the bag, loosening material and directing it through the bag spout.

the bulk resin into the hopper which feeds the flexible screw conveyor.

The frame is also equipped with spring-loaded Pop-Top™ bag extension devices that raise the bag-lifting frame and elongate the bag as it loses weight, promoting the flow of material from the corners of the bag through the bag spout.

Simultaneously, pneumatically actuated Flow Flexer™ plates raise and lower opposite bottom sides of the bag into a "V" shape at timed intervals, loosening agglomerated material and directing it through the bag spout.

With the new system in place, the company began purchasing 99+% of its resin in 1 000 kg bulk bags, which are discharged in their entirety and supplemented with manually dumped 23 kg sacks to achieve target batch weights of 9 090 kg.

"The retrofit added bulk bag unloading capability which practically eliminates manual lifting, slitting and disposing of paper sacks, which pleased the operators and cut resin loading time from about 60 minutes down to 15," Cortes said, adding: "At the same time the retrofit retained the operation of our original bag dump station with dust collection, which enables us to achieve accurate batch weights without investing in an automated weight batching system."



Forklift operator positions bag lifting frame on top of the bulk bag unloader. The 6,7 m long flexible screw conveyor transports resin from the bag dump hopper into a 22 713 ℓ tank.

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