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GULF SURGE

Rising from the wreckage of Hurricane Katrina, Tindall Mississippi Division moves inland and upward

A PENTON MEDIA PUBLICATION

Weigh batcher foils manual method

Dust generated by splitting and dumping of bags is contained by a dust collector at the bag dump station.

The upper flexible screw conveyor transfers aluminum powder from the bag dump station to the top of a weigh hopper, while the conveyor below feeds weighed batches to the blender.

A 30-ft.-long flexible screw conveyor transfers aluminum powder from a bag dump station to a gain-in-weight hopper on the mezzanine.

For lightweight concrete block fabricator H+H Celcon Ltd. of Kent, England, expert engineering has taken product design to new levels of precision and output. In the 1950s, the company developed a method to produce lighter concrete block by adding aluminum powder to the mix. Today, the largely manual process by which aluminum was added to the concrete mixture has been supplanted by an automatic weigh-batching system that provides greater accuracy, efficiency, and economy.

When added to a concrete mix, aluminum initiates a chemical reaction that generates minute bubbles. After the mixture partially sets, "Aircrete" blocks are cut and then cured in autoclaves, during which process the ingredients combine to form calcium silicate hydrates that strengthen the finished product.

For decades a partly manual process, blockmaking at H+H Celcon began with the transfer of measured amounts of cement, gypsum, lime, and a sand slurry mix from several exterior silos to a 77.7-cu.-ft.-capacity blender on the building's mezzanine level, nearly 20 ft. above the plant floor. The last step—adding aluminum powder—entailed a manual and potentially hazardous procedure requiring the operator to transport bags of powder from a storage area to a weigh station on the plant floor. Multiple batches of the powder were then weighed, rebagged, and carried via several stairways to the blender for addition to the mix. Extra bags of powder usually were prepared and held in reserve in case of spillage or loss.

Since weighing, transferring and dumping of material by one operator required two hours and generated considerable dust, an overhaul of the process was deemed essential. Yet, switching from 55-lb. to bulk bags was not an option, as aluminum powder has the characteristics of a semi-free-flowing material. Thus, it tends to pack, cake, smear, rat hole and even solidify, limiting its shelf life and offsetting any benefits of purchasing the material in bulk containers.

For improved powder handling, the producer's solution proved to be a Flexicon (Europe) Ltd. automated weigh-batching system comprising a bag dump station, flexible screw conveyor, and receiving hopper and controller. The operator now moves bags from pallets adjacent to the dump station onto a bag support tray, splits the bags, and then dumps them into a 7.9-cu.-ft. receiving hopper. A screen installed across the hopper's opening prevents bag scraps and other oversize particles from entering the process, while a side-mounted vibrator promotes uninterrupted flow of material into the intake adapter of the conveyor. The hopper is also equipped with a sensor to alert the operator to a low-level status.

The bag dump station is equipped with a high-velocity vacuum fan that draws airborne dust from dumping activities into a built-in dust collector. Released alternately at timed intervals inside the collector's dual-cartridge filters, furthermore, short blasts of compressed plant air cause built-up dust on outer filter surfaces to fall into the hopper.

Powder then is transferred from the hopper up a 45-degree incline through a 30-ft.-long flexible screw conveyor, consisting of a self-centering screw that rotates within an enclosed plastic tube. At the opposite end of the conveyor, the powder discharges into a weigh hopper equipped with a second, horizontally oriented 6.6-ft. flexible screw conveyor installed at the hopper's outlet.

The hopper-conveyor assembly is mounted within a support frame on load cells that transmit gain-in-weight data to a programmable controller. The inclined conveyor discharges material into the weigh hopper until the hopper gains 66.1 lb., at which point the controller stops the conveyor. The horizontally oriented conveyor then feeds material into the blender at a steady flow rate, thus preventing rapid influx of material that would occur through a slide gate positioned directly above the blender. It continues to run until the weigh hopper's load cells indicate zero net weight. Overall, system benefits include compliance with local health and safety requirements, as well as increased production efficiency, since the operator is able to attend to other tasks during the material handling process.

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