

Technical Article Series

Screen separator saves 1,000 lbs/day (454 kg/day) of reusable salt at pretzel plant.

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Screen Separator Saves 1000 lbs/Day Of Reusable Salt At Pretzel Plant Equipment Cuts Salt Bill 50%; Pays For Itself In Six Months

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New Solutions to Plant Problems

PROBLEM:

A grain of salt may not be worth very much, but when you are throwing away some 1000 lb of salt a day, it can make quite a difference. This was the problem faced by an Eastern food processor recently in its pretzel making operations.

The company has separate production lines for manufacture of large and small pretzels. The familiar loop-shaped pretzels require a coarse type "M" salt, while the smaller pencil pretzels take a finer grain type "I" salt.

The two production lines use about a ton of salt a day. Almost half of this was being lost through overspray and fallout during salting operations. Salt is sprinkled on the pretzels as they move to the baking oven on a mesh conveyor. Some of the salt spray misses the pretzels and falls into bag-lined hoppers below. Out of an 80-lb bag of fresh salt, only 30-lb or less might make it onto the pretzels.

Pieces of broken pretzel and fine pretzel dust in the accumulated salt rendered it unusable, so it had to be discarded. Plant officials looked for a way to salvage the salt by sorting out extraneous materials.

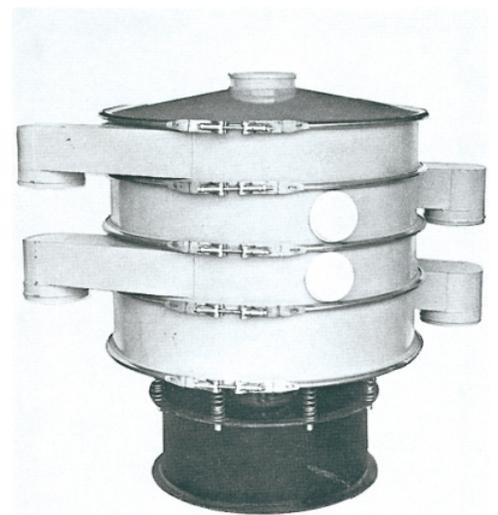
SOLUTION:

Analysis of the fallout debris showed well defined size differences between broken pretzel bits, pretzel dust, and the two grades of salt. It was determined that the materials could be sorted effectively with a multi-layered vibratory screen separator.

A three-tiered, 40"-diameter circular Vibroscreen TM was installed. The unit has three screen decks and three discharge outlets. At the top level, a 7 -mesh screen removes the unwanted pretzel bits, while allowing salt and pretzel dust to pass through freely. In the middle tier, an 18-mesh screen retains the coarse type "M" salt and directs it out a discharge tube for collection and reuse. At the bottom level, a 20-mesh screen traps the smaller grain type "I" salt and collects it for reuse. Pretzel dust and salt fines pass through and are discarded.

The separator unit installed at the pretzel plant is sized to remove and classify up to 500 lbs/hr of coarse salt having a bulk density of 70 lbs/cu ft. All product contact parts are made of type 304 stainless steel.

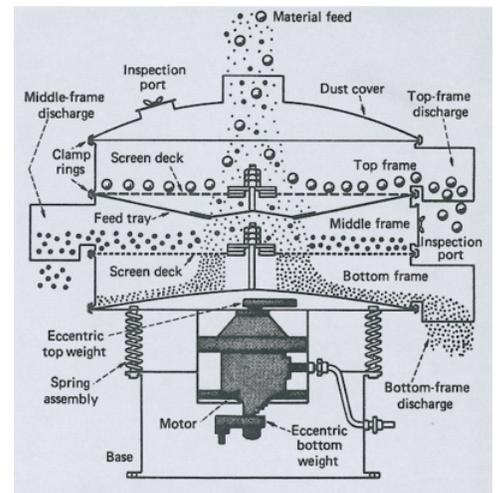
The basic assembly consists of a 1/3 hp motor and three vertical frames with screen cloth decks. Each deck has a discharge outlet. The motor has a double-extension shaft which is fitted with variable eccentric weights. One weight, mounted above the motor and spring assembly, generates a horizontal throw. The other, rotating below the assembly mass, causes a high-frequency tilting action. Tangential motion results from the combined horizontal and vertical thrusts. This action causes oversize particles to move laterally across the screen deck to a discharge outlet, while undersize particles flow through the screen. Top and bottom weights are independently variable and can be adjusted to obtain the desired degree of separation. Adjustments can be made by the online operator.



Tiered layers of separator screens are mounted over motor base and spring assembly.

RESULTS:

Reclaim hopper bags are emptied twice daily into the vibratory separator. Separation of coarse and fine salts from the waste takes only a few minutes. About 70% of the feed stream is reclaimed as coarse salt, 20% is reclaimed as fine salt, and 10% goes to waste as pretzel pieces and fine dust. Reclaiming the otherwise lost salt has cut the company's salt bill in half, and resulted in a six months payback on equipment costs.



Screened material flows from top entry port through separator screens to side outlets. Diagram shows a two-deck separator.