Technical Article Series

Abrasion-resistant dewatering screen cuts downtime and maintenance costs.

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Abrasion-Resistant Dewatering Screen Cuts Downtime and Maintenance Costs

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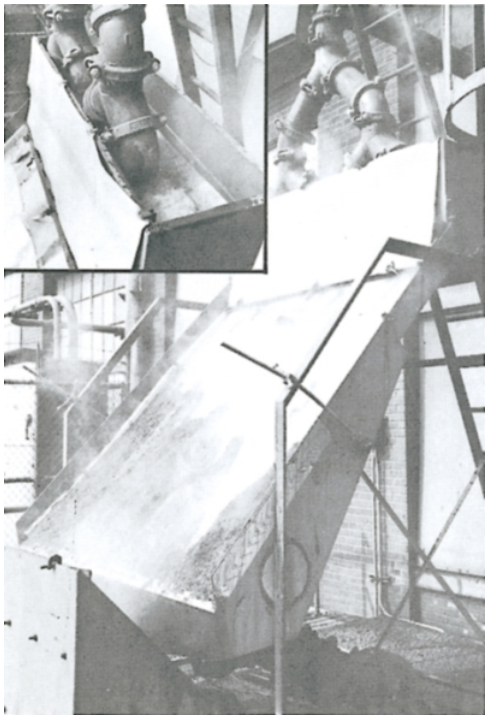

THE BASIC source of cast malleable iron pipe fittings and hanger parts at ITT Grinnell Corp. is its Columbia, Pa., foundry. Until last year, the cooling pond that handled cupola cooling water and slag-quenching water always was a potential source of trace metal discharge. Careful analysis of the situation by the foundry suggested that those metals could be eliminated if the quench water stream were recirculated. To perform recirculation, the highly abrasive slag had to be separated from the water mechanically.

Initially, a 60-in-diam, circular, vibratory separator equipped with a 60-mesh screen was installed. Problems plagued the unit from the start, and screens failed as often as once a week. Downtime and costs for replacement parts were excessive.

As an alternative, specialists at Kason Corp., Newark, N.J. developed a vertical-type. stationary screen separator. Designed for high-capacity dewatering capabilities, the unit contains no moving parts, and the screen is relatively abrasion resistant. Those features keep downtime and operating costs at a minimum.

The assembly consists of a head box that evenly distributes and controls velocity of the incoming water flow as it spreads across an inclined profile wire panel. The slots formed by the wires run at right angles to the flow of the fluid. As the flow moves down the inclined panel. the liquid layer closest to the flats of profile wire is deflected through the slots. and solids slide off the top of the deck. This action, termed the "Coanda" effect, enables the separator to dewater large volumes of fluid without mechanical aids.

The screen deck. 72 in. wide by 54 in. long, with slots .02 in. wide, can remove over 90% of incoming solids. All wetted parts are made of type 304 stainless steel. Kason engineers designed an innovative non settling head box in which material enters the head box vertically and passes over a series of inclined ramps before going over the acceleration ramp.

To combat abrasion, equipment surfaces in contact with the glasslike slag were lined with 3/8 in. of a special rubber. This abrasion-resistant material lines the inclined ramp and vertical surfaces where the cascading stream changes direction. An elongated acceleration ramp allows a film layer of water to stand between the slag particles and the slotted deck.

By minimizing slag contact with the deck, this feature reduces abrasive wear. Deck life is prolonged further by use of a reversible panel which is reversed every two months.

Minor startup bugs were worked out quickly. and the unit has performed flawlessly since the beginning of 1982. Signs of wear in either the non-settling head box or the slotted panel are negligible. Besides the bimonthly panel rotation. the only required maintenance consists of an occasional brushing down of entrapped particles.

Another advantage of the high-speed dewatering cross-flow sieve is its resistance to freezing during the cold winter months, a feature that makes year-round operation economically feasible.