How can I retrofit my screener to overcome performance and capacity problems?

Most screeners have two parameters that can be adjusted to overcome performance and capacity problems: screening media and the screen deck slope. As far as screening media, most screeners use wire cloth screen decks. The wire cloth openings are directly related to performance and can affect capacity. Small changes in the openings could improve your screener performance. Capacity may be improved by providing more open area by selecting finer wires or switching to rectangular or slotted screen openings.

Sloping of the screen deck can also affect a screener's performance and capacity. On many rectangular screeners, sloping the screener will increase the material flowrate down the screen deck because of gravity, thereby improving capacity. It could also improve the performance since material flowing at a faster rate will lower the screen's bed depth. This makes it easier for fine material to work its way through the coarse material and pass through the screen openings. The openings may have to be increased slightly depending on the degree of downslope as well as the opening size required to provide the correct aperture for screening accuracy.

Jack Steinbuch, general sales manager, Cleveland Vibrator, 800-221-3298

How can I keep my screener running at high rates while producing sharp size separations?

Make sure your screener provides the following:

- Effective screen motion — amplitude, speed, and alignment — for the material to separate
- Adequate screen area for the feedrate and separation efficiency required
- Uniform material distribution over the screen area with minimal material agitation
- Effective screen deblinding

In addition, make sure that other factors in the process aren't adversely influencing the sifter's performance. These include static charge on the particles caused by the material grinding or pneumatic conveying systems, excessive airflow into or away from the sifter, and spouting restrictions to or away from the sifter.

Bob Ricklefs, sales manager, Great Western Mfg., 913-682-2291

First, don't try to alter factors that are determined by physical laws. To make sharp size separations, every particle has to come in contact with the screen. A screen measures a particle's width and thickness — don't expect the screener to make a separation by particle length or density. In most process situations, separation quantity and quality are inversely related. Analyze the material to be separated; keep in mind that the differences in the particles' physical characteristic make the separations.

Next, accurately determine your process line's maximum capacity. Then size the screener so that your maximum requirement is in the middle of the unit's operating range. Third, provide the screener with a consistent flowrate. Fluctuations in the flow will negatively affect the separation quality. And finally, don't forget to size the machine's discharge to handle the required capacity.

Jon Moreland, sales manager, Oliver Mfg., 719-254-7813

Check motor rotation, which is critical to screener efficiency on many separators. Choose the correct antiblinding device (ball trays, plastic sliders, or screen heaters) because a blinded screen can't perform properly. Make sure that material is properly fed to the screener. Round screens should be fed at the center and rectangular screens should be fed evenly across their entire width. All screening equipment should be free of surges.

W.J. "Bill" Crone, president, Midwestern Industries, 330-837-4203

If you're using perforated plate screens, change to woven wire screens to increase your open area percentage. Choose a screen that has a maximum ratio of opening-to-wire diameter consistent with necessary strength. Try a slotted wire cloth if permitted by your particle shape and material specifications.

Plot the size distribution of your feed material on a log-probability grid. Most distributions will plot as a fairly straight line, allowing for easy interpolations. Mark your specification limits and your screen openings on the grid. Most specifications allow some deviation above and below the nominal size range. Taking into account that screening efficiency deteriorates rapidly as particle size approaches the screen aperture, use the curve's slope at the coarse and fine limits to evaluate the probable effect on material size distribution of incremental differences between the aperture size and your nominal specification limits. Often, you can increase within-spec production this way without any change in the process flowrate.

Unless your screener is gyratory with material introduced on the centerline, visually check the material distribution across the screen surface's width. The oversize bed depth should be reasonably uniform. If it isn't, experiment with flow divider vanes, reversing plates, or another means of improving the material distribution at the material feed point to the screening surface. Irregular distribution can easily reduce capacity by half at a given efficiency.

If your screener has a motion component in a direction at right angles to the screen surface, the depth of the retained material bed will affect its efficiency. For the best efficiency at any depth, the amplitude of the component normal to the screen surface should vary in some direct proportion to the load. A corollary is that efficiency, even at optimum amplitude, will tend to decline as the load increases. In many designs, amplitude is adjustable. When you make changes from the manufacturer's initial amplitude settings, adjust the frequency by the inverse square root of the amplitude ratio in order to maintain the initial energy level with least effect on bearing life.

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Equipment suppliers are a valuable source of information about equipment and processes. In light of this, each month we ask suppliers a question of concern to our readers. Answers reflect the suppliers' general expertise and don't promote the suppliers' equipment. If you have a question you'd like suppliers to answer, send it to Alicia Tyznik, Associate Editor, Powder and Bulk Engineering, 1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (atyznik@cscpub.com).