Tips for optimizing screen performance

Screening problems can have a disastrous effect on a production line. One piece of equipment can cause expensive shut-downs and delays, so finding and fixing—or better yet, preventing—problems early is crucial. This article, which compiles information from several suppliers, reviews tips that can help you keep your screener operating at its best.

Troubleshooting screen issues early can help you avoid bigger, more costly problems down the road and keep your process running smoothly. Here are some tips.

Carefully choose the right screen for your application.

This might be the most important factor in achieving top separation performance. While stainless steel woven wire is the most common screen material for separating dry bulk solids, there are other options. Screens can be made from woven synthetic filaments like polyester and nylon. These filaments are smooth and flexible, making synthetic screens less prone to blinding than woven wire screens in some applications. Synthetics are also suited to screening materials that are too corrosive for stainless steel woven wire. Synthetics aren’t suited for materials with a static charge.

In other applications, the screen material isn’t a screen at all, but a perforated metal plate. The plate, which has round holes rather than square openings, is stronger and more durable than woven wire screen. The plate also presents a very smooth surface to the material moving across it, which helps separate elongated particles from granules or more spherical, uniformly shaped particles. The round openings provide a more precise opening size than a woven wire or synthetic screen’s square openings because the round holes don’t have the square openings’ larger diagonal dimension. However, the plate has a very low open-area percentage, which reduces capacity and makes the plate susceptible to blinding. A common application for perforated plate is removing streamers and strands from plastic pellets.

Once you’ve selected and purchased a screen, ensure that it will provide top separation performance over the long term by properly transporting, storing, installing, and maintaining it. Always transport the screen in its original, reinforced container. Store the screen vertically in this container until you’re ready to install it. This will both conserve floor space and prevent damage caused by stacking other items on the screen. Also be sure to follow the manufacturer’s instructions when installing the screen.

Take extreme care when handling and installing the loose screen. Any dents or creases in the screen cloth will create stress concentration points that can lead to premature failure (tears or holes).

Lay the groundwork for good maintenance.

Effective maintenance for any type of screener is based on: properly locating the unit, training workers, and developing a maintenance inspection schedule and checklist.

Screener location. If possible, install the screener in an area that provides easy access for the workers who regularly inspect the unit and for the maintenance workers who service it. A floor-level location is not only easiest and safest for your workers, preventing them from having to climb ladders and platforms, but it will help ensure that workers inspect and service the unit on a regular basis. Make sure that there’s adequate space around the unit to enable workers to easily inspect the screener’s mechanical parts, including the drive mechanism, and easily remove and replace the screens, which can be quite large. Easy access to the discharge outlets (which are typically equipped with inspection ports) or to the tailings container helps workers analyze the screened material for signs of problems with the raw material, the screener, or upstream equipment.

Worker training. Train your inspection and maintenance workers to know which screener components to inspect, how to perform preventive maintenance, and how to repair or replace worn or damaged components on the unit. With good training, they’ll be able to notice component wear and unusual operating noises before the screener slows or stops running or your product quality drops.
Maintenance inspection schedule and checklist. The inspection frequency will depend on various factors, including your screener’s application (quality assurance or processing) and the material it handles. For instance, you may choose to inspect a screener at the raw material receiving point after each bulk load, while a screener in a processing application may dictate regular, even round-the-clock inspections to catch problems before product quality is affected. More frequent inspections are required when faster wear is likely, such as when your screener operates at high speeds or handles an abrasive material.

To aid the inspection process, develop a checklist of items to examine during each screener inspection. Typical listed items are the screens, screen frames, screen cleaners, gaskets between screen decks, drive mechanism, screen-clamping mechanism, and the connections to upstream and downstream equipment. Provide a space after each item on the checklist so workers can initial and date it, producing an inspection record for future reference.

Also include a space on the checklist where workers can record problems they’ve noticed — for instance material leaks, vibration issues, and strange sounds — so your maintenance workers can fix the problems the next time they service the unit.

To ensure that the screener continues to operate effectively, regularly inspect all items listed on the checklist.

Monitor screener capacity for gradual decline and early signs of trouble.

Paying close attention to how your screener is operating can help you stem larger problems from developing. For instance, a sudden drop in screener capacity could have several causes. It could be a material problem, such as an increase in moisture content, or a change in ambient conditions, such as higher temperatures or humidity. If screener throughput drops during the day shift but returns to normal during the night shift, higher daytime temperatures may be the culprit. To solve such problems, you may need to modify material storage and handling practices or improve temperatures and humidity control in your screener area.

Other potential causes of capacity decline can include improper screen tension, screen deck wear, or unsuitable or worn screen cleaners.

Improper screen tension. A correctly tensioned screen is completely taut. This stretches out the mesh to the designated mesh opening size. An incorrectly tensioned screen will sag on the insert frame, causing the mesh openings to distort and restrict your material’s flow through the screen. Poor tension also can cause material to puddle on the screen rather than pass through the mesh openings. Establish a time interval for checking screen tension. The interval will depend on your screen type and manufacturer. For instance, you should typically tension a manually adjustable insert screen once a week. Also check nonadjustable screens once a week to see if they’ve sagged or stretched and require replacement.

Screen deck wear. To prevent contamination, particularly if your screener uses stacked screen decks to process spices or other extremely pure products, you need to prevent screen deck abrasion. You can install screen decks with flaps on the edges that completely seal each screen from the others. You can also improve the screener’s longevity by installing a target plate across the inlet to disperse material so that it doesn’t crash down on the deck and abrade it. The target plate channels the material into the screener only as fast as the material can be processed, eliminating overloads.

Unsuitable or worn screen cleaners. Carefully choose screen cleaners for your screener. The cleaners can be balls, cubes, or other items that agitate, tap, or wipe the screen during sifting to prevent material from clogging or blinding the screen. You may need to run tests to find a screen cleaner that prevents blinding without wearing the screen. Whichever cleaners you choose will eventually wear. Check them periodically and replace them before they’re 20 percent reduced or small enough to pass through the retainer wire and end up in your material.

Whether the problem is large or small, address it immediately. The screener’s constant motion can very quickly turn a small problem into a big one.

For further reading

Find more information on screeners in articles listed under “Screening and classifying” in Powder and Bulk Engineering’s article index in the December 2015 issue or the Article Archive on PBE’s website, www.powderbulk.com. (All articles listed in the archive are available for free download to registered users.)

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