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A 60 durometer urethane flex panel.

Solutions for Dry Fines Screening

By Louis Ondrias

The aggregates industry has for many years battled to improve screening efficiency in fine "dry" screening applications. The problem is that these "dry" screening applications are very rarely dry. They typically involve screening material that has a moisture content of 3 percent or greater and that means blinding, especially in the 1/4 in. minus opening decks. Blinding causes problems with product gradations and can reek havoc in crushing and screening circuits.

A screen deck may start out clean and efficient at the beginning of a production shift, but accumulative blinding can cause fluctuations in product gradation curves. It can also cause variations in feed rates and gradations to other parts of the screening and crushing circuit thus disrupting not only product gradations but plant performance as well.

Moisture in material has a number of sources but the ones that seem to cause the most problems in everyday screening and crushing circuits are:

- Weather—rain and melting snow,
- Natural moisture in quarried or pit run material, and
- Water added for dust suppression.

Many plants have to shut down when it rains, especially those with 2-3 percent inherent moisture in quarried or pit run material. The increase in regulation of fugitive dust has made it necessary for producers to have more water sprays in more areas of their dry screening and crushing plants. In many plants, proper dust control cannot be achieved without adding through water to the material to cause blinding on fine opening screen decks. Inherent moisture in many dry mined sand and gravel pits make fine dry screening a real challenge.

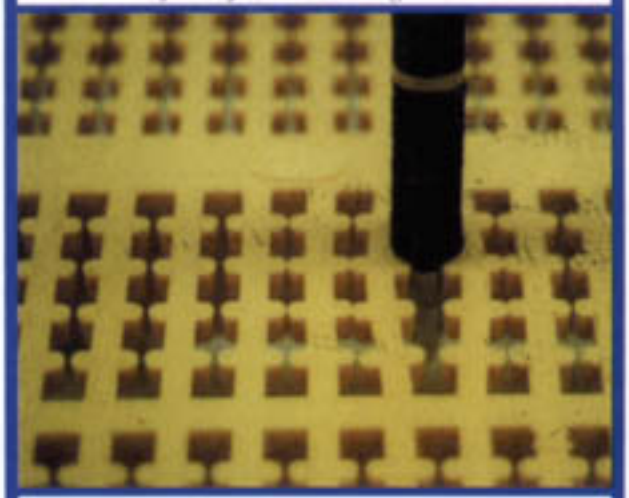
Long slotted wire screens had been the norm for many years to combat blinding. However, with the advent of tighter state, private, Superpave product specs, a "tighter" separation is required in secondary and tertiary screening applications without passing elongated or slivered materials. Anyone dealing with Superpave specs has come to learn what 3 to 1 particle size is! Blend and batch type plants need properly graded material without elongated particles in their bunkers in order to blend properly graded materials. Many applications with material in the 8-10 percent and higher moisture range cannot be screened efficiently without using a long slotted wire, but these applications are usually not producing the tight asphalt or Superpave specs.

The introduction of synthetic and special weave wire cloth has greatly helped improve screening performance in many applications. These screens are no longer "new age" synthetic surfaces but have been in use for several years in some of the largest and most prestigious quarries and pits in the United States.

- The Z slot, Vino, or "diamond weave" wire cloth has proven effective in many blinding applications, especially in portable plants where product changes are common and it is not cost effective for the operator to tie up money on different openings of the more expensive synthetic screens. The triangular-shaped aperture requires knowledgeable sizing in order to get the correct separation, but these screens will produce a better product than long slotted wire screens. In hard rock and gravel applications, wear-life may be a concern, and a determination of cost effectiveness compared to throughput must be made.

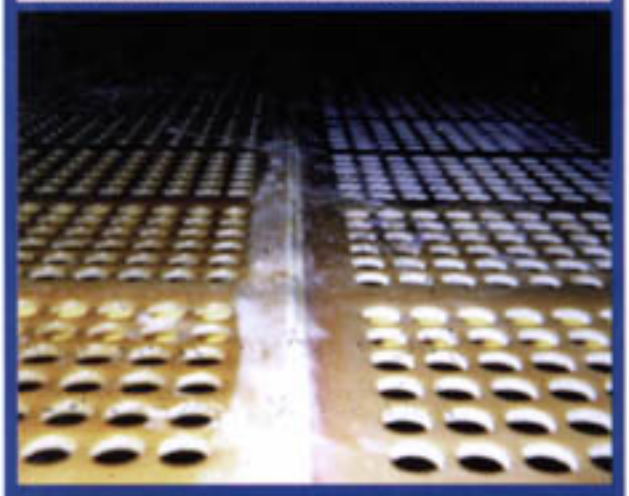
- Low durometer (40 shore) and punched rubber screens are widely used in the aggregate industry. Though much lower in open area, these screens tend to blind less than wire cloth thus making the screening area available to screen. The wear life is definitely better than wire cloth.
- Urethane membrane screens offer both high open area and good wear life. This is a punched urethane membrane that is pretensioned to be lively, flexible and resilient. These screens give the highest open area of any synthetic screen and, in some cases, can match or beat the open area of square mesh wire cloth in smaller openings. The membrane screens perform well, but are not designed for applications with larger (about 3/4 in.) top size or increased bed depth.
- Low durometer (60 shore) urethane flex screen panels are not as flexible as rubber panels or the urethane membrane panels, but can be used in applications with larger top size and heavier bed depths.
- The injection molded 1 ft. x 1 ft. "disconnected web" design panel is a unique screen that has done well in many applications. Though not as flexible as some rubber and urethane membrane screens, it uses a longer web to give it flexibility. The web design has 90° bends that brings the web together, but still "disconnected" with the adjoining web to produce what looks like a square opening. These 1 ft. x 1 ft. panels can, in some cases, offer more open area than rubber screens, but typically not as much as the membrane screens. These panels are usually made of an 80 to 85 durometer urethane and can be cost effective against wire cloth.
- Rubber, low durometer flex urethane and urethane membrane screens are available in standard hook type tension screens and modular decks. Modular screen decks can offer up to 25 percent more capacity than crowned decks because of the flat deck design with even bed depth and feed over the whole deck. This factor can often make up for the loss of open area with some synthetic screen media in many applications.

1 ft. x 1 ft. Non Blinding Screen



Membrane Flexible Non Blinding Modular Screen

Membrane Flexible Non Blinding Modular Screen



It is not uncommon in blinding and plugging applications to find the problem compounded by the screening machine not running at the proper speed and stroke or G force. An incline machine running at 1/4 in. stroke and 850 rpm is more likely to blind than one running at 5/16 in. and 900 rpm. The VSMA (Vibrating Screen Manufacturers Association) handbook is an excellent reference for information on speed and stroke and screening applications. Anyone having plugging or blinding problems should check the speed and stroke of the machine. Contact the machine manufacturer, a knowledgeable screen media manufacturer or local equipment dealer for help and information.

The best thing you can do about a screen problem is to become knowledgeable about what is available in the market. Find the best people selling and servicing products in your area. Speak with local producers and also those not necessarily in your area. Many companies are now regional and national, and you should use this in-house resource to find out what your counterparts are doing. Remember, there are solutions available for many screening problems today. Become knowledgeable and you can profit from them. ▲

Louis Ondrias started in the aggregate industry for Gifford-Hill and Company at the Eagle Lake Plant in Texas in 1974. He worked as quality control manager, maintenance foreman and then plant manager. In 1984, Ondrias went to work for Isenmann as area sales representative for the southwest United States and western regional sales manager before being promoted to product manager and moving in 1990 to Lexington, Ky., where the TEMA Isenmann manufacturing plant and home office is located He belongs to the National Stone Association and various state associations.