

A review of anti-blinding devices for screening equipment

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The materials being screened can partially or totally blind screening surfaces. This article discusses three causes of screen blinding and reviews several anti-blinding devices available for use in circular vibratory screens or centrifugal sifters.

Screen blinding generally occurs three ways: when near-size particles clog the apertures; when fibers staple around the wire; or when materials, resins, fats, oils, or similar deposits cover the wire.

Near-size blinding occurs when near-size particles (approximately one-half to one-and-one-half times the size of the screen aperture) compete for the openings and lodge within them. This problem requires anti-blinding devices that impact the screen or directly impact the particles to dislodge them.

Fiber stapling occurs when wet or dry fibrous material partially protrudes through an aperture and, due to the screen motion, winds itself around the wire blinding the aperture. This problem requires anti-blinding devices that cut or shear the fibrous material so it can't wind itself around the wire.

Material deposits create blinding because they cover the wire screen. This problem requires anti-blinding devices that wipe either the screen top or screen bottom or, in many instances, wipe both the top and bottom simultaneously.

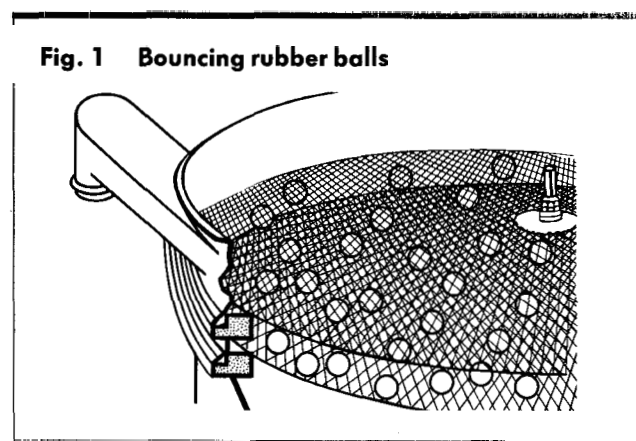
The following sections discuss several anti-blinding devices used in circular vibratory screens or centrifugal sifters.

Combating blinding in circular vibratory screens

You can reduce blinding in circular vibratory screens by using "V" belts, anti-blinding balls, rings or sliders, brushes, rubber blades, or wipers.

"V" belts. The simple "V" belt is one of the earliest anti-blinding devices for circular vibratory screens. This economical, lightweight, topside wiper — which stretches approximately the machine's radius and drops around the center post — moves along the top surface of the operating screen due to the machine's vibratory motion. The "V" belt provides additional impact to the screen surface and helps dislodge near-size particles.

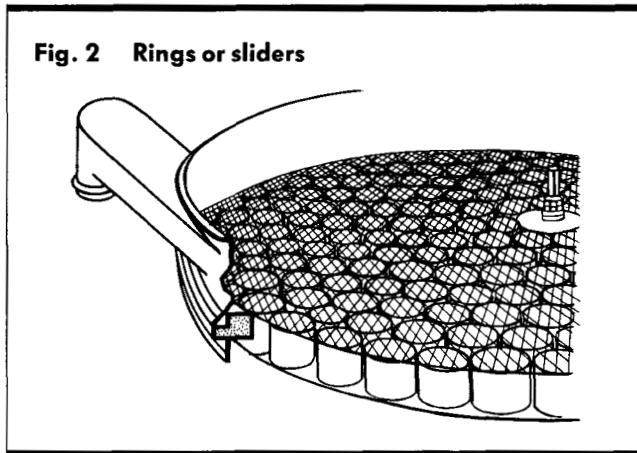
Anti-blinding balls. These are rubber balls that bounce between the underside of the operating screen and the topside of a retaining screen (Fig. 1). The balls provide high-impact momentum at relatively low frequency.



In general, balls are used when near-size blinding is a problem and when the diameter of the screen wire is reasonably heavy. They are particularly useful for dislodging material in screen media coarser than 30 or 40 mesh. With finer meshes, the balls' high-impact momentum tends to stretch the wire.

Anti-blinding balls are available in a number of synthetic or natural rubber formulations. Pure gum rubber formulations are suitable for abrasive applications. Formulations resembling children's "super balls" are suitable for cold, outdoor applications because the balls retain their bounce in low temperatures. To choose the correct formulation for cold applications, compare the operating temperature with published data on the retained mechanical properties of rubber formulations at specific temperatures.

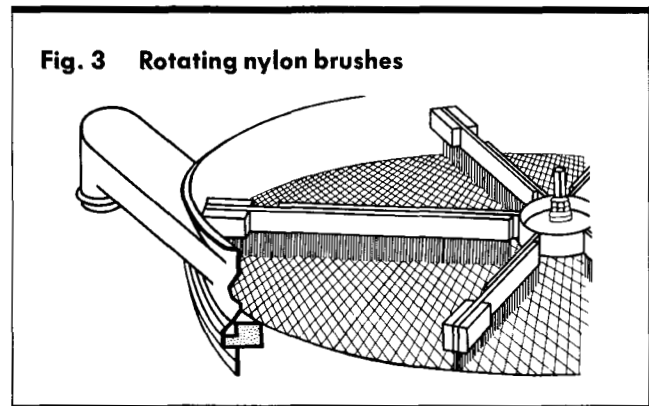
Rings or sliders. These are hollow cylinders (Fig. 2) that move beneath the operating screen to dislodge particles. They are kept in place by using a perforated plate or by sandwich mounting them between the operating screen and a coarse retaining screen.



Rings or sliders impart a low-impact, high-frequency pulsation to the underside of the operating screen. The pulsation causes minimum disturbance to material moving across the screen and maintains high screening efficiency.

Rings or sliders are generally used with screen media finer than 14 mesh; coarser mesh with heavier wire won't flex under the low-impact momentum. Because these devices are usually constructed of nonmetallic material, caution is needed when screening abrasive solids: Abrasive particles can embed in the nonmetallic material and abrade the underside of the operating screen. When rings or sliders operate at elevated temperatures, aluminum or stainless steel can replace the nonmetallic construction.

Brushes. Rotating brushes (Fig. 3) sweep near-size particles from the topside of an operating screen. Driven by the machine's vi-



bratory motion, brushes are most effective when used with a woven wire screen that has apertures one-half the bristle diameter or smaller. Small apertures prevent the brushes from sticking into the opening and from contaminating the material if the bristles break. Because the brush assembly adds weight (the assembly must be rugged enough to withstand the screening vibration), brushes shouldn't be used on screen media finer than 100 mesh.

Rubber blades. Rotating rubber blades use a wiping action as they lift off of and land on the screen surface. Rubber blades are excellent for high-impact, low-frequency movement of near-size particles. They also remove material deposits from the wire and are particularly effective in liquid/solids separations, even when the liquid leaves behind material that blinds the wire. Like brushes, rubber blades shouldn't be used on screen media finer than 100 mesh.

Wipers. Lightweight, topside wipers act like brushes, but weigh less and can be used with fine screen meshes. Wipers have chemical limitations, depending on the elastomeric material used in their construction.

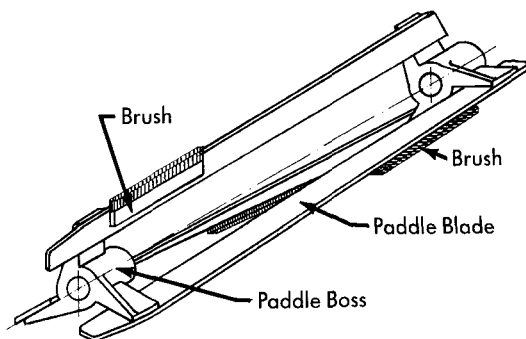
Combating blinding in centrifugal sifters

Centrifugal sifters have the same blinding problems as flat-deck screening equipment. Equipment to combat blinding in centrifugal sifters consists of a device (such as a brush) that attaches to the paddle blade of the sifter's rotating paddle assembly (Fig. 4). The blade pushes the wedge of solids around the cylinder; by agitating the solids, fine particles are able to reach the screen surface and move through the apertures.

The anti-blinding device reduces the clearance between the paddle blade and the cylindrical screen; however, the device must also provide enough clearance to release oversize particles without abrading them against the screen, causing screen failure.

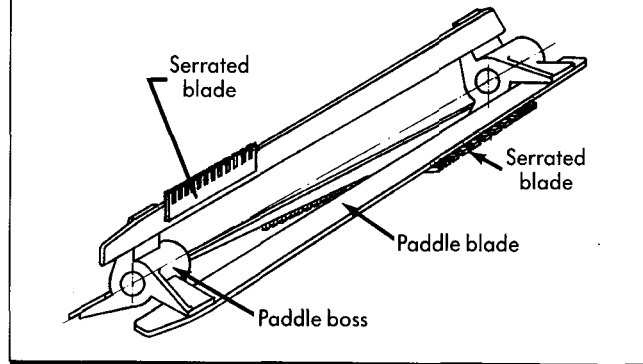
Brushes. Brushes (Fig. 4) are flexible and allow oversize particles to pass without harming the screen; they are maintained about $\frac{1}{16}$ to $\frac{1}{8}$ inch from the screen surface and do not contact the screen. Brushes have two limitations: their construction material, which is either natural bristle or nylon; and the size of the screen aperture. Brush bristles that are smaller than the aperture may break at the tip and pass through the screen.

Fig. 4 Brushes attached to rotating paddle assembly



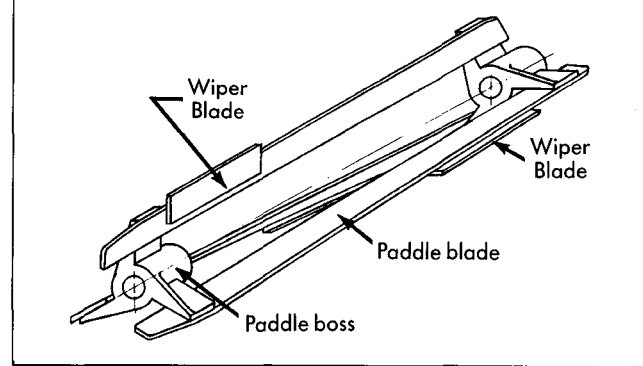
Serrated blades. Serrated plastic blades (Fig. 5) are effective for coarse screen mesh where brushes are inappropriate. The blades agitate the screen surface and allow oversize particles to pass without causing undue pressure on the cylindrical screen. In addition, the serrations agitate the material bed and allow fine particles to reach the screening surface.

Fig. 5 Serrated plastic blades



Rubber wiper blades. Rubber wiper blades (Fig. 6) effectively handle fibrous material that would entangle in brush bristles or wrap around serrated edges. The blades' smooth surfaces prevent the fibrous material from entangling on them. The rubber construction is flexible enough to bend and allow oversize particles to pass. Rubber blades are also effective in liquid/solids separations.

Fig. 6 Rubber wiper blades



Conclusion

Because blinding dramatically affects screening efficiency, you should track actual production against the rated throughput levels of your screening equipment. If blinding is causing productivity to drop, one of the solutions described in this article may help.

PBE

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