

Elevator and Separator Maintenance

Part three of a five part series by Eugene Tarabek

Eugene Tarabek is president of Tarabek, Inc., a consulting firm that provides technical support for blast cleaning and shot peening equipment. He has been involved with operating and training schools for the past twenty years. Most recently, he is conducting schools throughout the U.S., Canada and Mexico, covering the operation and adjustment of centrifugal blast equipment.

Elevators

Elevators are supplied in various sizes, based on the volume of abrasive and contaminants being handled by the system. The elevator belt should be kept tight and tracking on the head and tail pulleys. This will prevent the belt from slipping on the pulleys and causing premature wear by allowing abrasive to pile up in the boot section. If the elevator belt is allowed to rub the side of the casing it will eventually wear a hole in the casing and damage the belt.

All elevators have adjusting bolts (take-ups) to keep the belt properly adjusted and tracking properly. Before attempting to adjust the belt tension be sure the bolt threads are clean of any foreign material, such as dust or abrasive. If the buckets are hitting the elevator casing this is an indication that the belt tension needs to be adjusted. Wear on the bucket lips should not exceed 1/2 of an inch as this will allow a deeper amount of abrasive to accumulate in the boot section of the elevator causing premature wear to the boot pulley and belt.

Once a month, the covers on the elevator boot section of the elevator should be removed to allow the cleaning out of any contaminants and keeping the abrasive loose. If abrasive is allowed to become hardened it will cause the elevator to jam if a foreign object gets into this area.

Always use a scraper bar to remove debris and stir up the abrasive. Keep in mind whenever working on or around the equipment to be sure to LOCKOUT THE MAIN PANEL DISCONNECT SWITCH.

Separators

The separator is another important element of any peening operation from the standpoint of determining operating costs from worn parts. Let's review the functions of the separator and then you will see why this statement is true. The functions of the separator are:

1. To control the sizing of the abrasive mix which in turn has a strong influence on cleaning efficiency.
2. To remove the smaller abrasive and contaminants from the abrasive curtain so that only good, clean and properly sized abrasive is fed to the wheels/nozzles.
3. To control the abrasive consumption rates. Abrasive consumption is determined by the size of the abrasive pellets removed from the machine. The separator makes this selection.

From these examples you can see that the setting of the separator is of major importance in controlling all phases of operating costs. All separators use the air wash principles because of the ultra fine adjustments possible with this type of device to remove under-sized abrasive.

Heavier components will fall right through the air stream without being disturbed by it. It is obvious that the more suction, the larger the pellet that will be pulled out of the air stream.

If we disturb this curtain, and make it heavier at one end and thinner at the other, the air will follow the line of least resistance and go through the thin curtain area. This will cause the velocity of the air in that end to be substantially greater than what it might be if it were spread equally across the whole area. Therefore, we will be pulling out heavy pellets in the sparse end and leaving substantially lighter contaminants in the dense end. (See example A.)

While the actual separators you find on peening equipment are a lot different from our example of the vacuum and the curtain, they only differ with respect to how we obtain the uniform curtain and suction. For instance, the standard gravity separator has a series of flat plates that are all designed to spread the abrasive so that the curtain flowing past the air wash is always uniform. The first element that does this is the tramp metal screen that catches tramp metal to keep it from lodging in the lower portion of the separator and disturbing the flow of abrasive.

The tramp metal screen also starts to spread the abrasive. We have the sliding adjustable baffle, spreader plate, that acts to spread the abrasive across the full width of the air wash. Then we have the swinging baffle that controls the thickness of abrasive curtain. Once the full curtain of abrasive is maintained you can then adjust the air flow across the curtain by opening/closing the slide gate in the vent line coming off the separator.

The air wash itself flows from the open side of the separator, through the wash area into the plenum chamber from which it goes to the dust collector. The plenum chamber is primarily used to settle out the larger particles/contaminants that were pulled out of the air wash curtain of abrasive so that the dust load to the dust collector doesn't become excessive. (See example B.)

What usually goes wrong with the separator? First of all, the draft on the separator can be too great, causing the removal of too large a size pellet, or too little, causing the retention of fines. This can be adjusted and corrected by the blast gate located between the dust collector and the separator. The next most common problem within a separator is uneven abrasive flow which can be caused by tramp metal lodging under the swinging baffle, holes in the screen, a warped or missing swinging baffle, or a worn or missing stationary baffle. Any one of these will cause abrasive to channel which, in turn, will cause too large a pellet to be pulled out on the sparse end while leaving contaminants in the mixture on the heavy-flowing end of the curtain.

One other important component that will cause the separator to malfunction is the dribble valve that is attached to the end of the flex tubing. When functioning properly it prevents the air wash curtain from being starved of air flow. Remember, air travels to the path of least resistance so if air is allowed to flow up through the fines discharge, it will reduce the air flow through the curtain of abrasive.

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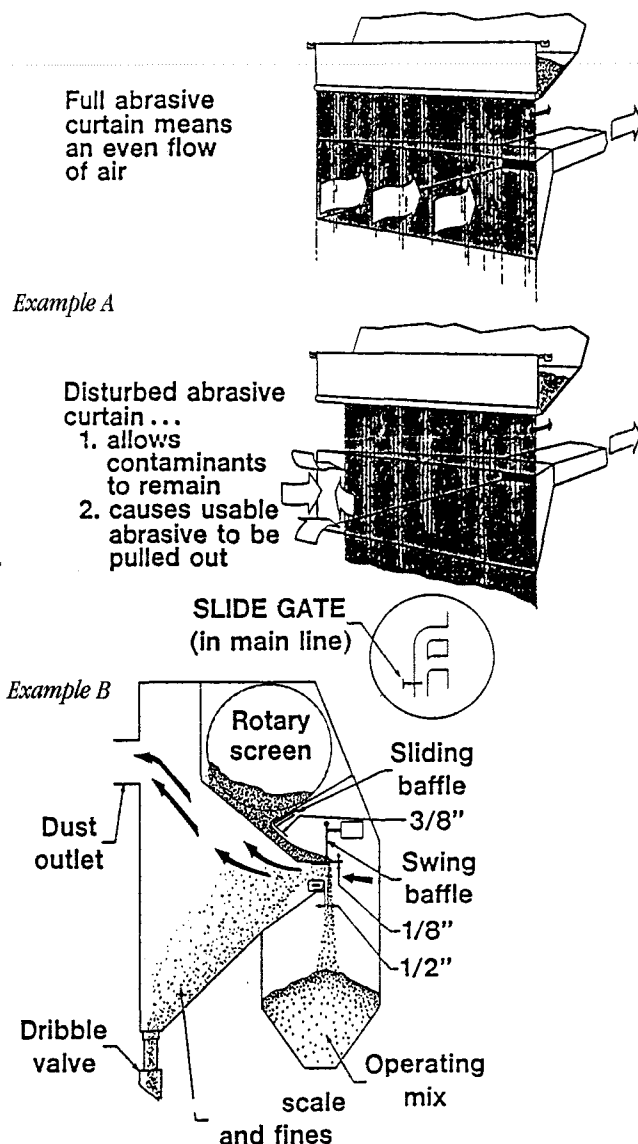
Also the air traveling up through the fines tube will pick up abrasive and metal particles and carry them into the vent pipes/dust collector. Be sure the dribble valve is mounted ABOVE the container receiving discharge to prevent the flex tubing from filling (backing) up into the expansion area of the separator. This will prevent the larger particles from discharging out the fines tube and cause them to be carried out into the vent pipe or dust collector.

Because the effective operation of the separator depends on the air flow following a certain channel, it is important that holes in the metal case or the weldments do not permit air leaks. If air enters the separator at other than the proper openings, the volume of air at the separation point will be reduced and the peening efficiency of the separator will suffer.

The best way to check to see if a separator is functioning properly is to screen a sample of the operating mixture and separator discharge. I recommend a screen analysis rather than a visual analysis of each of these because it is extremely difficult to get a quantitative measure of the condition of the abrasive mixture or separator discharge by just looking at it. The screen analysis is an exact breakdown of the various mixtures.

In the next issue I will discuss Dust Collectors. ●

A separator works like a vacuum cleaner:



Friess Equipment, Inc.: CO₂ In-the-Press Rubber Mold Cleaning System

Friess Equipment, Inc. recently announced an addition to their popular line of Automatic and Manual Rubber Mold Cleaning Systems. The state-of-the-art technology is a CO₂ blast cleaning system that utilizes readily available block dry ice as the blast media source. Standard block dry ice is loaded into the system where it is automatically processed into a granular media. The dry ice media is then propelled against the workpiece to remove contamination without affecting the substrate. The system is very portable and designed for in-the-press cleaning of rubber molds. Contaminated molds can be spot cleaned in-the-press between cures to significantly extend the production run life of the mold and minimize mold tear-downs.

For more information call Friess Equipment at 1-800-899-7624 or fax to (330)923-5833.

Clemco Industries Corporation: Baking Soda Blast System Cleans Without Damaging Surfaces

The new Aerolyte Soft King blast system, from Clemco Industries, uses lightweight blast media to gently clean or strip coatings without affecting delicate surfaces. Load the Soft King with bicarbonate of soda, super fine glass bead, or other fine mesh, non-aggressive media to safely and effectively remove graffiti from masonry and stone.

The Soft King works wet or dry. Unlike slurry systems that dissolve the media, the Soft King injects water at up to 400-psi into the media just before it exits the nozzle. This delivers the full cleaning power of dry blasting, while the water effectively suppresses dust.

Fine, lightweight media tends to clump and flow erratically. The Soft King features a 60 degree cone and a unique internal agitator to keep the media flowing smoothly at all pressures and feed rates. Independent regulators and gauges allow precise control of pot pressure, water pressure, blast pressure, and agitation.

The versatile Soft King blasts at pressures ranging from 5 to 150 psi. Low pressure dry blasting safely cleans mild oxidation from electronic components. High-pressure blasting, wet or dry, strips hardened coatings from steel surfaces. Other applications include: cleaning stainless steel food preparation surfaces, cleaning ornamental stonework on buildings without marring windows, and stripping automotive coatings all at once or layer-by-layer.

The Soft King comes mounted in a two-wheel cart that fits through standard doorways, making it perfect for contractors and rental fleets.

For more information contact Clemco at (314)239-0300 or fax to (314)239-0788.