Nepean Rubber & Plastics Production Tips

✗ Poor maintenance can lead to inefficiencies & low-production volumes

✓ Proper practices keep your screen clean and your operation profitable

When production fails to meet expectations it's a common practice for producers to focus on their crushing operations. But, a frequent — and often overlooked — culprit in low-production volume is the screening operation and its performance efficiency**.**

What can impact a screening operation and lower its production?

Inefficient screening and poorly maintained screens each can affect the success of any operation and its costs, no matter how much material is produced per hour. Lower production rates, poor product quality, complicated and expensive process add-ons, increased wear on other equipment, and higher labor costs are all outcomes of poorly performing screens. Frequent shutdowns to replace worn or broken screen cloths or to clean screens due to blinding, pegging, or clogging; or having in-spec product trapped in an endless loop — re-circulating in closed circuit systems — all greatly affect production and cost producers millions of dollars in lost revenue each year.

Hidden costs

It might not be immediately obvious, but if a screen is not operating at its intended capacity, it can severely affect a producer's bottom line in a number of ways.

A blinded screen can reduce screen efficiency by 70 percent or more. So, a 8' x 20' screen deck suffering a 70% efficiency reduction suddenly is producing at the level of a 4' x 12' screen deck.

Further, a rule of thumb is that a fully loaded screen deck that is even partially blinded — say just 5% — will result in a total production loss equal to the percentage of the screen that's affected. This means a single screen deck blinded just 5% on a 500-ton-per-hour plant that produces 1.2 million tons per year will lose about 60,000 tons of that total production in spec product every year. At a $10-per-ton selling price, this operation could easily lose $600,000 per year in potential revenue from what seems like a small screen deck problem. And, this example illustrates the effect realized from only one screen deck on one screen box. Multiply it by multiple decks and screen boxes for the true result of poor screening efficiency.

The cost of inefficient screening doesn't end there. Poor screening often leads to poor product quality or out-of-spec product, both of which can have far reaching repercussions. On the plant side, these include the additional cost and time to re-screen the material, additional wear and tear on the equipment, the cost of re-circulating material through the crusher, lower prices, and even lost customers.

For the customers of the aggregates operation, an out-of-spec product could cause them to face stiff penalties and fines for using inferior stone, as well as delayed project costs while the stone is being replaced, often eliminating any hope for an early completion bonus. In addition, inconsistent gradations can cause asphalt and concrete mix design complications, typically requiring completed jobs or portions of jobs to be replaced at the contractor's cost.

The cost of inefficient screening can also severely affect a portable contract-crushing operation. For example, a 350-ton-per-hour portable crushing and screening plant working to fulfill a 500,000 ton contract would generally require 3,150 tons of production per day within a nine-hour day — and approximately 159 working days to complete the contract, working five days per week for a total of almost 32 weeks.

If the plant had even a 5% reduction in screening efficiency due to blinding or pegging, it could require the contractor to spend eight more days on the job to complete the project. Eight days might not sound like much, until electric power, diesel fuel consumption, wear on the equipment, and employee salaries are taken into account. And, those eight days are also lost to starting another contract. Because income for a portable crushing operation is often based on the number of contracts that can be completed each year, every day lost directly affects income potential.

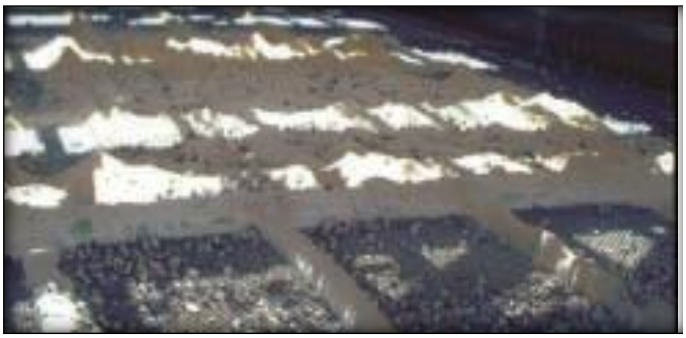
Viewed in this light, an inefficient screen certainly takes on ominous possibilities.

An operation screening limestone experienced severe blinding, which required daily shutdowns of the screens for cleaning. This "before" photo reveals the blinding on the woven wire bottom deck.

A non-woven, self-cleaning, wire screen cloth eliminated the blinding problem and increased plant capacity, reducing the need to shut down the screen for cleaning.

***Before:** Sand and gravel operation, material was pegging on the screen, requiring the operation to regularly go through a tedious cleaning process. This photo shows the screen cloth is 50% pegged.*

***After:** The woven wire screen was replaced with non-woven, self-cleaning screen cloth. This photo shows the panel one week after installation, with the pegging problem - and the need for frequent shutdowns - eliminated.*



Self-cleaning wire screen media was installed as a test screening calcium carbonate. Woven wire was placed in between the non-woven panels on the same screen deck. This photo shows the woven wire and non-woven panels on the same screen deck after six weeks of production. The non-woven panels are clean. With a full installation of this type of self-cleaning screen cloth, shutdowns for cleaning can be greatly reduced.

One of the easiest ways for producers to check the Performance of their woven wire screens is to look closely at the pile of discarded screen cloths for a history of recurring problems, such as broken wires, wires pulled from the hooks, blinding and/or pegging or unusual wear patterns.

Not rocket science

Although many producers believe the opposite, maximizing screening efficiency is not rocket science. Simple, consistent screen box maintenance and taking advantage of the more recent screen media solutions available today can help ensure a higher level of in-spec product production.

Although there are many different types of screen media, from woven wire and polyurethane to punch plate and rubber, the vast majority of screen cloth used today is still traditional woven wire. When screens using woven wire "fail," the problem often results from broken woven wire screen cloth typically occurring for one or more of the following reasons:

- Poorly tensioned, loose screens that beat themselves against the crown bars at a high frequency;
- Inconsistent crown bar heights preventing a proper arc for the screen cloth to tighten and rest against
- Worn out, damaged, or missing clamp bars and rubber channel that allow material to wedge between the screen cloth and screen box rails
- Wash plant spray bars that force a steady stream of water directly onto screen cloth wires from a close distance or that run when there's no aggregate on the screen deck leading to "drilling" holes into the wire
- Excessive impact on the feed end of the screen from material falling too great a distance onto the screen or very large material falling onto small wire diameters, causing premature wear and breakage
- Off-calibration of a screen's eccentric throw, damaged springs or rubber mounts, or decks affecting a screen's vibration can prevent an even flow and spread of material across the screen cloth for maximum throughput.

All of these problems are relatively easy to spot with frequent visual inspection of the screen boxes and screens, while they are in operation and when shut down. A formal inspection schedule, similar to those typically practiced with the crushing operation, will allow producers to make pre-emptive repairs and adjustments before problems begin to affect production.

Frequent inspections also allow a producer to make repairs or replace parts when it's convenient, not during the height of the production day.

Producers should also check the performance of their woven wire screens. One of the easiest ways to achieve this is to look closely at the pile of discarded screen cloth for a history of recurring problems, such as broken wires, wires pulled from the hooks, blinding and/or pegging, or unusual wear patterns.

Weekly and Daily Screen Maintenance

Daily maintenance routine

1. **Check the oil level and add oil if necessary.**
2. **Check the breather caps for buildup.**
3. **Set the belt-tensioner spring tension at the recommended setting.**
4. **Free the screen box of material build-up beneath the vibrating basket.**
5. **Make sure the guards are in place and are in good condition.**
6. **Check the screen cloth draw bolts for proper tension.**
7. **Make sure the snubber rubber is in contact with the snubber plates.**
8. **Make sure the feed box is free of excessive material build-up.**

Weekly maintenance routine

1. **Inspect screen cloth and feed liner for excessive wear.**
2. **Inspect the springs for excessive wear.**
3. **Inspect the drive shaft seal for leakage; add fresh grease.**
4. **Inspect the drive belt and sheaves for excessive wear.**
5. **Check the tag tension band for damage.**