

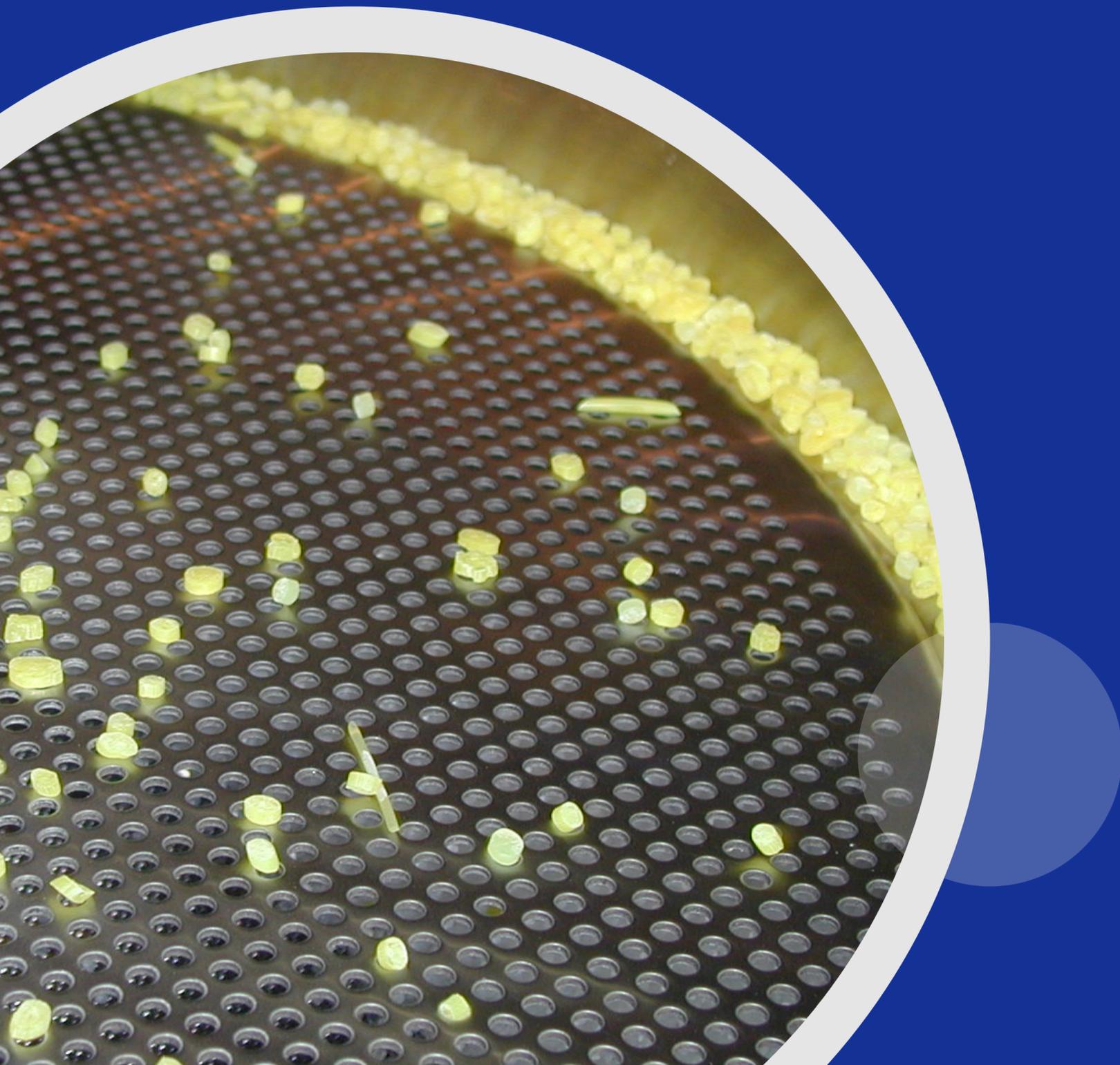


Identifying Issues in Sieving and Product Transfer Processes

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CONTENT PAGE

Introduction.....	3
General Guidelines.....	3
Bulk / Big Bag handling equipment (Raw Materials).....	4
Batch sieves/vibratory sieves for quality assurance.....	4
Vibratory separators for grading product classification.....	4
Linear vibrating screens for grading product classification	5
Vibratory feeders for transferring and continuous feeding	5
Elevating Equipment for product transfer	6
Flighted conveyors for product transfer	6
Aero-mechanical conveyors for product transfer	7
Ultrasonic sieving	7
Process Machinery Solutions From Gough Engineering	8



INTRODUCTION:

The transference of product/WIP from the value creation/value adding process machinery needs to be reliable, safe, continuous and delivering or accepting volumes at the correct quantity/speeds to secure optimise processing machinery performance.

When process machinery problems occur, the consequences can be costly and frustrating. Unplanned downtime or poor performance are enemies of productivity, as the entire production line may have to be halted to allow remedial action to be taken, leading to lower throughput, missed delivery schedules and, inevitably, lost income from reduced output.

Many common issues can be avoided utilising excellent design and build quality, so at Gough, we design, supply, install, and commission bespoke material handling solutions that deliver exceptional performance and reliability.

GENERAL GUIDELINES

General guidelines to help prevent issues in production process equipment:

- ✓ Ensure that equipment is suited to the application for which it is intended as different separation and sieving machinery is designed to handle different product applications, as do elevators and feeders for product transfer.
- ✓ Monitor throughput between different process equipment to ensure underloading or overloading is not occurring.
Ensure equipment is clean from debris, where necessary, to reduce wear on components.
- ✓ Implement a comprehensive and methodical programme of preventive maintenance to ensure issues are identified and rectified before they cause major problems.
- ✓ Ensure operatives are properly trained in the correct operation of machinery to reduce the likelihood of machinery and hence production issues.

What steps can be taken to resolve individual problems by equipment type? Let's look at each equipment category in turn from the beginning of the production lines with handling raw materials using Big bags Dischargers, to batch sieving in quality control, product classification by particle sizes and material transfer / elevation with feeders and elevators.



Bulk / Big Bag handling equipment (Raw Materials)

Bulk handling equipment, such as Big Bag Dischargers require the transfer of raw material from bags and then into the production line. To do this successfully there are a number of control aspects that require maintenance, such as:

- ✓ Ensure there is no variation in big bag dimensions outside the specification of the big bag frame's holding capacity.
- ✓ If the equipment features a hoist, this lifting device should be regularly checked and certified to ensure it is in optimum condition.
- ✓ Ensure there is no obstruction if a cruciform required loading into the Big Bag frame.
- ✓ Ensure the Big Bag frame is secured properly to the ground.
- ✓ Ensure any untie chambers are clear of any debris
- ✓ Ensure any choke valves are operating correctly and clear of debris/product or obstructions.
- ✓ Ensure any additional devices such as agitators/paddles are working correctly to help the exiting of product material from the Big Bag itself.
- ✓ Ensure any interfaced hoppers with its feed controls are correctly setup.



Batch sieves/vibratory sieves for quality assurance

Industrial batch sieves and vibratory sieves are used to agitate compacted raw materials and separate oversize / fine particles or contamination (e.g. debris from bags) through effective screening. However, the efficiency of the system can be affected by:

- ✓ Blinding/ pegging or blocking of a mesh aperture.
- ✓ Loose deck clamps can cause the decks to not vibrate properly.
- ✓ Checking the motor weights are correctly set.
- ✓ Identify if the mesh has lost its tension.
- ✓ Identify any loose mechanical fixing and are maintained.

Vibratory separators for grading product classification

When operating at an optimum level, vibratory separators deliver excellent cost-efficiency and effective results by processing and separating particles of different sizes. Efficiency and accuracy can be affected by:

- ✓ Over time, a wire mesh can wear, even torn and require changing, particularly if used to filter abrasive materials.

- ✓ The mesh can become loose in the long-term, meaning a new mesh will need to be fitted.
- ✓ When the mesh or plate becomes blinded it will be unable to perform to a high standard as it inhibits throughput and the volume screened will reduce, therefore regular checks/cleaning may be required.
- ✓ Inflatable air bellows may be incorrectly pressurised and require repressurising.
- ✓ Ensure the material is flowing in the right direction on the screens with the correct wiring of power to the unit.
- ✓ Identify any loose mechanical fixings and are maintained.

Linear vibrating screens for grading product classification

Ideal for delicate products, or those with large particles that need to be removed, linear vibrating screens use fine mesh or perforated plates to allow the raw material to pass through (such as flour or powders).

- ✓ Over time, a mesh may become loose or torn, in which case replacement is recommended.
- ✓ When the mesh or plate becomes blinded it will be unable to perform to a high standard as it inhibits throughput and the volume screened will reduce, therefore regular checks/cleaning may be required.
- ✓ Ensure the tension of any wire mesh in a lawn-frame design are secure ensuring all clamps are correctly secured.
- ✓ Ensure the unit is sitting on firm ground and level in most cases unless it is a declining linear unit.

Vibratory feeders for transferring and continuous feeding

Vibratory feeders, which use a combination of vibration and gravity to move raw materials to the next stage of the manufacturing process, benefit from good quality design, reliable components such as motors and general build.

For Electro magnetic driven feeders, it is important to ensure the variable speed control provided is set to the correct level for the application and product being fed – reference the operations manual if required.

- ✓ Ensure the feeder is on level ground and correctly positioned.
- ✓ Ensure any slide gates / choke plates are correctly positioned on any x attached/feeding hoppers.

Elevating Equipment for product transfer

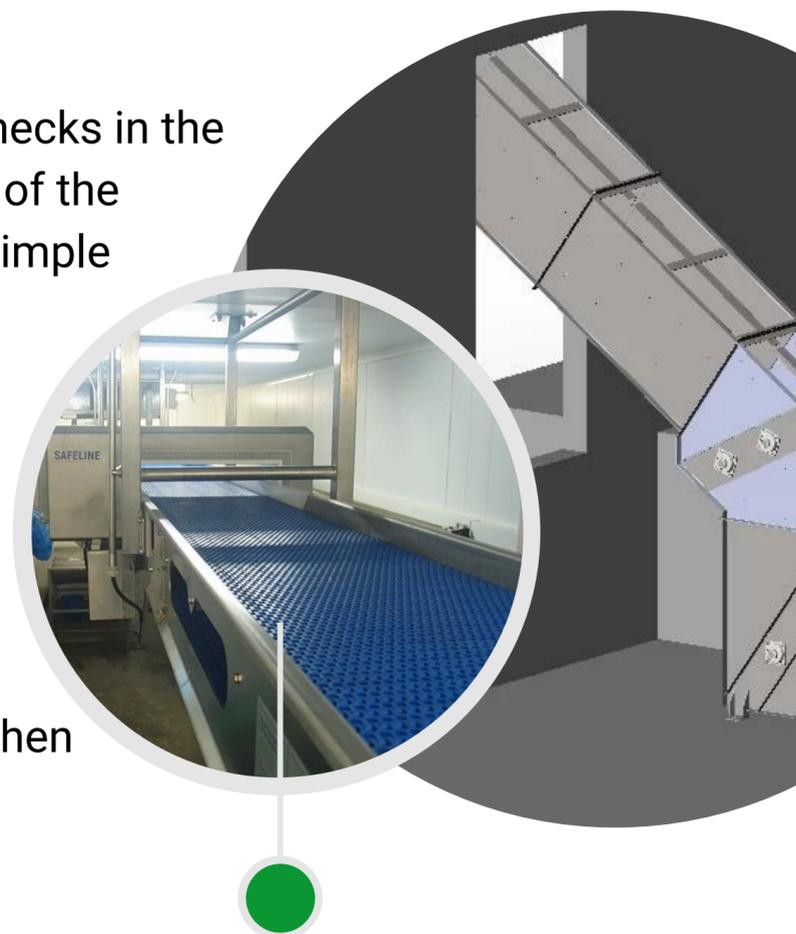
Bucket elevators allow the transportation of bulk materials on free-flowing product between different stages in the production process. Although continuous bucket elevators are highly effective, several factors can cause problems to occur, such as slow speeds, low yield, high noise pollution and infill losses or even overflowing issues. Here are some specific points to be aware of:

- ✓ Ensure the feed and feed controls are set correctly to generate the right speed and type of flow of product into the entry point of the elevator, normally relying on gravity between feeder and elevator feed point. This is critical and matched to the elevator specification.
- ✓ Buckets may become damaged with regular use or even mislaid.
- ✓ Drive components with operational lives of 5-10 years when properly maintained but without proper maintenance goes undetected will result in loose or worn components.
- ✓ The elevator drive including motors, chains, bearings etc. running 365/24/7, will wear over time for both abrasive and non-abrasive product materials and therefore must be checked regularly.
- ✓ Poor cleaning can result in the build-up of materials within the elevator components and also can lead to cross contamination if the elevator has a variety of products running through it.
- ✓ The elevator CAMS may become worn or damaged.
- ✓ Tipping point mechanisms may become damaged/loose and therefore not providing the correct tipping point or action.
- ✓ Operational cleaning is therefore critical in the successful running of the elevator and must be trained accordingly especially where selective discharges or inlet points exist where the mechanisms require attention.

Flighted conveyors for product transfer

An underperforming belt conveyor can cause bottlenecks in the smooth movement of raw materials from one stage of the production process to the next. Although relatively simple devices, they can cease to work reliably if:

- ✓ The belt becomes worn, misshaped, or frayed.
- ✓ The belt is misaligned on the chassis rollers.
- ✓ Slippage can occur if the belt is not tightened correctly.
- ✓ Poor design can lead to contamination issues when cleaning especially for hygienic applications.



- ✓ Ensure the conveyor support frame is properly installed.
- ✓ All moving parts such as bearings are running smooth and freely.

Aero-mechanical conveyors for product transfer

For aero-mechanical conveying there are some fundamental checks that can be made to check the machine is running normally and include the following:

- ✓ Check for wobble, dragging or knocking in the main sprockets.
- ✓ Check for any damage / dents in the main tube sections.
- ✓ Check all fasteners are correctly tightened
- ✓ Check rope is inserted in the correct direction and rope is not frayed.
- ✓ Check all discs are not worn, cracked, or out of shape.
- ✓ Check rope tension is not loose or over tightened.
- ✓ Check for no blockage in the entry or head chutes.



Ultrasonic sieving

Ultrasonic sieving is ideal for applications in which high quality sieving or separation is required for certain fine product and assist in automatic deblinding of a screen. High-frequency ultrasound waves are directed into a matched screen resonator which is attached to a screen frame to separate and sieve raw materials, so action must be taken if the following problems occur:

- ✓ The fitting from the ultrasonic generator to the mesh can become loose, so must be torqued to the correct level.
- ✓ If the frame is worn or damaged it will affect the performance of the machine and must be replaced.
- ✓ Check the temperature of the screen does not get too hot from the ultrasonic connection.
- ✓ Ensure the ultrasonics is set to the correct frequency, as the controls can offer 50-100% ultrasonic vibration.
- ✓ If the tension of the screen becomes loose, this will dramatically effect the performance of the ultrasonics.
- ✓ For fine meshes using ultrasonics, careful and consistent cleaning may be required depending on product material specifications.



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