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You Say Potato I Say Potato

by Win Nye & Jim Ling

In a snack food plant processing potatoes, round Sweco machines are used in several areas performing separation to the flume water, the peeler water and in the slice wash and starch recovery system.

Potatoes are dumped into a water filled slide, a flume, to transport them to other areas of the facility and to wash them during their journey. While in motion the spuds are washed and carried, but as they travel, abrasion of the skin and flesh of the potato occurs.

The flume water becomes murky with potato, skin and the soil washed away. If this solid material is collected, the flume water can be recycled and the solid material sold as animal feed for local farmers.

In a typical application, flume water is split between two round separators depending on the flow rate. The overs discharge is connected to a Sweco Integrated Screen Press (ISP) so that a head of liquid can be run and the throughput can be increased. Without the ISP, the material discharged is about 8% solid; using the ISP, the material is about 16-20% solid and can be transported via truck. A small quantity of presate is returned to the inlet of the Sweco for reprocessing.

These flows are typical in the season when potatoes from the Midwest are being processed. More challenging is the screening of those grown in Florida where the soil is sandier. This debris tends to slow the screening process down significantly.

The liquid which has been screened is further processed downstream, running through hydrocyclones where solids are discharged for further processing through a plate press where a cake at 60% solid is produced. This material is then land applied or sold to farmers as feed. The clean side of the hydrocyclones discharge effluent to a recycle tank where the water is used for peeler operations or reused for the flume.

Integrated Screen Press

HOT TIP

Optimizing Your Separator's Performance

Standard round vibratory separators use a vibrating screen enclosed in frames which are vibrated by a motion generator consisting of a double-end shaft, vertically mounted motor with eccentric weights on the top and bottom. As the motor rotates counter-clockwise (CCW), the weights generate a radial centrifugal force causing the spring mounted machine to vibrate.

There are three independent input variables to a vibratory separator: top force, bottom force, and lead angle. The output variables are horizontal motion amplitude, vertical motion amplitude, and phase angle.

The Top Weight - has an adjustable force output and a fixed angular orientation on the motor shaft. It spins at the separator's center of gravity (CG) creating a uniform horizontal radial motion of the machine without any torque about the CG. Horizontal motion of the body occurs in the direction of the top weight force. Variable horizontal motions occur as the magnitude of the top force is varied.

The Bottom Weight - also has an adjustable force output, but includes a variable angular orientation in relation to the top weight. It is below the machine's CG. The bottom force weight induces a torque about the CG creating vertical motion as the machine tilts from the vertical axis. Adding more bottom weight yields more vertical motion.

Lead Angle - is the CCW angle between the top and bottom weight. When the weights are vertically aligned, there is a zero degree lead angle. When the bottom weight is 120 degrees CCW from the top weight, and the motor is spinning CCW, the bottom weight leads the top weight. The maximum vertical motion generated by the bottom weight will occur 120 degrees of motor rotation before the maximum horizontal motion generated by the top weight.

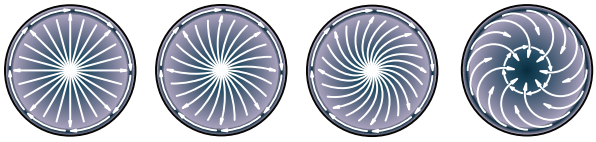
Lead angle gives a round vibratory separator unparalleled functionality by controlling the material flow pattern. As the lead angle is increased from zero degrees towards 50 degrees, the horizontal radial particle displacement is diminished. The radial velocity of the particle will decrease because the horizontal tangential motion is increasing. This yields an increasing spiral path to the flow pattern.

At a 60 degree lead angle, the material appears to travel only tangentially. Particles are launched vertically 60 degrees before the top weight and land 60 degrees after the top weight in the same radial position on the screen. Material will not readily discharge from the spouts at this setting.

As the lead angle increases above 60 degrees, the radial inward displacements increase. If the particle lands after the maximum radial displacement, then the particle will move radially outward. If the particle lands before the maximum radial displacement, then the particle will move radially inward.

Vertical and Horizontal Motion Amplitudes - are easily measured using a vibration gauge sticker. These stickers are attached to the outside of the machine near the screen level. The vibration amplitude can be read while the machine is running, by observing where the triangular lines cross.

Lead Angle Patterns



0° 15° 35° 90°

Phase Angle - is the measured delay between the maximum vertical and horizontal motion. A computer monitoring system, such as the Sweco Motion Analysis System, is required for phase angle measurement.

By having a thorough understanding of vibration and vibration generation, you can adjust the control parameters discussed in this article to achieve optimum separator performance.

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FEATURE PRODUCT

MX *Separator*

Sweco, the world leader in separation technology, has taken vibratory separation to a new level. Introducing the latest in round separation technology, the Sweco MX™ Separator. This new generation separator has design features to increase safety, provide a stronger construction, and allow for a more sanitary process.

The totally enclosed weight guard on the MX Separator prevents “reach-in” injuries, complying with European CE Standards. The extremely rugged construction of this machine utilizes conical construction rather than flat plates which creates a more rigid geometric structure. The open base construction allows for cleaning underneath the unit, therefore preventing dirt and product build-up.

Safer, Stronger, Cleaner. Since 1942 Sweco has been developing separation products to optimize your processing experience. The MX Separator. Simply one more innovation from Sweco.

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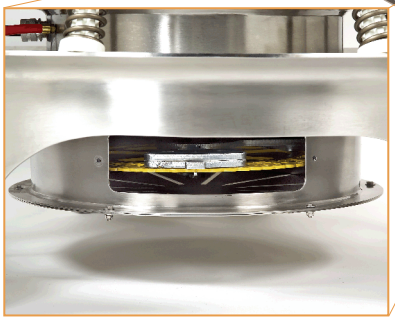

PANEL DOORS TO THE ENCLOSED MOTOR ALLOW QUICK ACCESS TO THE TOP AND BOTTOM FORCE WHEELS FOR EASY MOTION AND FORCE CHANGES

DID YOU KNOW?

We're Expanding in India

In order to better service our customers in the Asian market, Sweco is expanding its facility in India. Due to the increase in demand in the market, the plant will be moved from its current Mumbai location to a new site in the city of Vasai (approximately 45 km from prior location).

The new location nearly doubles the area of Sweco India's current Mumbai facility. This upgrade will allow Sweco India to more efficiently and effectively service their customers with the addional manufacturing capacity.

Here are a few intereting facts about India that you may not have known:

- Origin of Algebra, Trigonometry and Calculus studies
- Most post offices in the world
- Seventh largest country by area, second largest by population
- Mumbai is the most populous city in the world, 13 million people
- The Indian film industry is the largest in the world
- The Indian Railway System is the largest employer in the world employing over 1 million people
- Until 1896, India was the only source for diamonds to the world
- The Baily Bridge, in the Himalayans, is the highest in the world

CHECK OUT OUR ...

New President

After a 31 year distinguished career at Sweco, former Sweco president Brenda Beers-Reineke has moved to the M-I SWACO corporate offices in Houston, TX as Vice President, Human Resources.

This past May, Dave Sorter was named as the new President of Sweco. Dave will lead the industrial businesses of Sweco and United Wire, as well as our ES manufacturing operations. Before being appointed president Dave's most recent position at Sweco was that of Director Global Manufacturing Operations.

Dave joined Sweco in 1994 after eight years with GE Aircraft Engines. He has a BBA from Eastern Kentucky University and an Associates of Mechanical Engineering from Cincinnati State. Dave has spent his career learning and implementing a wide variety of Continuous Improvement / Lean Systems with great success.

Sweco On The Road

Interested in seeing our equipment first hand? Here's where we'll be for the remainder of 2008.

INFOVRAC (Paris, France)
Dates: July 17-19, 2008

MINExpo (Las Vegas, Nevada)
Dates: September 22-24, 2008

Powtech (Nürnberg, Germany)
Dates: September 30 - October 2, 2008

Pack Expo/Process Expo (Chicago, Illinois)
Dates: November 9-13, 2008

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