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Safeguarding your brand against recalls

Mitigating contamination points and reducing kibble degradation are critical food safety components that should not be overlooked.

Not a month goes by that the Food and Drug Administration doesn't issue a recall for a pet food product due to the potential of Salmonella. Empty shelves with ominous recall notices and social media spread the news of pet food recalls like wildfire. Even if the recall is done voluntarily, the brand name is damaged and worried pet owners look to another brand that is "safe."

"Most pet food manufacturers tend to be reactive. They are laser focused on the testing protocols of food safety and working to find solutions as hot spots in their process present themselves," says Matt Craig, Industry Director at Schenck Process. "However, taking a proactive approach by reviewing critical capital investments to reduce kibble degradation is really the base to establishing critical product safety that can also positively impact the bottom line."

Pneumatic conveying

The days of conveying finished product or in-process kibble with mechanical equipment, drag conveyors and bucket elevators are coming to an end.

"How do you sanitize a bucket elevator? How do you clean an exposed chain that is running through the middle of your product? You can't," comments Craig. "It's all about risk mitigation — eliminating process steps that have the potential for recontamination. However, hot spots could still exist. Even if you could clean a mechanical conveyor, how much automation would be required to make the sanitizing process robust and repeatable?"

To mitigate contamination points in the process, many pet food manufacturers are investing in dense phase conveying systems after processing points, such as dryers, coaters, coolers and finished storage bins. "In these conveying systems, you need to clean the feed point and the termination point, as well as keep the pipe clean," says Craig. "Our current focus in this area is equipment, such as cleanable rotary valves, receivers with engineered access to promote cleaning and special ledge-free couplings for reduced harborage points in the convey line. Line cleaning systems, such as 'pigging,' are

also being explored to eliminate any areas of material build up, which may have occurred during the convey cycles."

Kibble degradation, or fines, introduces many potential contamination points into the manufacturing process. Storing the materials and reclaiming them for reprocessing requires multiple sets of conveying systems to get them back to the front of the process. "Fines reduction leads to improved general 'housekeeping' which will lead to a reduction in foot traffic cross contamination and potential microbial harborage points," comments Craig.

Because we recognize the brand damage and negative impact to the bottom line that a recall can bring, Schenck Process is working on line cleaning and sanitizing steps, as well as validation of the overall process to establish that a viable log reduction has been achieved using the combined approach. This process will include, at minimum, a line pigging step after manual cleaning of the feed and termination equipment, along with the introduction of ozone integrated into the controls of dense phase systems for seamless injection into the convey line. "Repeatable and documentable practices are the most current sanitation steps, but are only as reliable as the personnel performing the steps," says Craig. "We are looking at an integrated and documented solution for sanitizing convey lines with a focus on post



CRA Cleanable Round Airlock, High Process Rate Airlock

extrusion applications,” says Craig. “We want to provide a validated solution for maintaining sanitation levels in the facilities before the concentrations of Salmonella get too high to manage in downstream process areas. These solutions will be the next step in a proper food safety program that our clients can use to control microbial counts across their facilities.”

In addition, Schenck Process will focus on developing a validated sanitation step for extruder negative air lift systems in the coming year.

Air filtration

To minimize contaminants and improve operator safety, Schenck Process designs pneumatic receivers with side entry filter access to eliminate confined space entry and operators interfacing with food contact areas.

“We’ve been designing these systems for easier filter maintenance and clean-down accessibility. A two-hour and two-person job can now be accomplished in a fraction of the time with one person,” comments Craig. “This increases the ability of the plant to keep its filters running efficiently and effectively without being a drain on valuable resources.”

Applying additional air filtration capacity to existing facilities can also provide the benefit of reducing the amount of fugitive fines accumulating within the factory. “Given the half-life of many micro-organisms, a small amount of dust accumulating overhead can place a major food-safety issue into motion,” per Craig. “Our focus is to close off as many areas as feasible within a factory to keep contaminants from coming into contact with the kibble. Total product isolation from the environment is a critical next step for pet food manufacturers.”



Cleanable Side Entry Receiver (CSER), Industrial Air Filtration

Rooting out the causes of contamination

Because the FDA has a zero-Salmonella policy, any positive hits stop a production line. Recently, Craig consulted for a pet food manufacturer that kept getting positive recall hits after its extruder.

“The customer couldn’t figure out why they were getting these positive hits. The direction that we gave them was that they needed to look at the pipe couplings in their system,” says Craig. “They found they had a leaking coupling that was bringing in air from the outside environment, which was causing the contamination.”

To address this issue, Schenck Process is now building a new style of coupling for extruder negative air lift systems that reduces degradation, removes gaskets from the product zone, and provides positive coupling alignment to reduce contamination from material buildup or external leakage.

“Our team doesn’t just focus on pneumatic conveying systems. We differentiate ourselves because we are knowledgeable about fugitive dust filtration systems as well as weighing and feeding systems that tie all of these process operations together,” comments Craig. “We aren’t experts in extrusion, but we know a lot about extrusion. We’re not experts in drying or coating, but we know a lot about drying and coating because we interface with those pieces of equipment all the time across the pet food and human food markets.”

“Having some of that process knowledge regarding how these systems actually operate and interact with convey systems allows us to look at it differently because we focus on pneumatic conveying every day, and for most of our customers it’s an afterthought,” he says. “When we see an issue a customer is having, it’s an opportunity for us to provide solutions that not only protect our clients’ brands, but more importantly, protect their customers and their pets.”

Moving the industry

Schenck Process is striving to improve the pet food industry, from a food safety perspective, by replacing mechanical systems with pneumatic systems.

“These new systems are designed to minimize kibble degradation so there is net financial return,” says Craig. “Designing equipment that is easy to clean and sanitize helps pet food manufacturers maintain a HACCP plan. Systems that mitigate the potential of recontamination points by putting in something as simple as the right type of coupling to hold a pipe together can be the

difference between getting safe product out the door or issuing a recall.”

“It’s all about risk mitigation – eliminating process steps that have the potential for a recontamination point.”

Ingredient tracking mitigates risk, protects brand

In 2007, the pet food industry experienced its worst rounds of recalls because of melamine tainted ingredients from China. LASI received two tote bags of rice protein that were contaminated with melamine. “The totes looked exactly the same as always — there was no visible difference,” says Lortscher. “Because of our ingredient tracking process systems, we were able to offer the FDA exact proof of where each batch was distributed. Our recall experience was limited to a very small scale.”

Each raw ingredient that enters the plant is assigned a lot number and entered into the computer system. When this bag of raw material is taken from the warehouse and used in the production system, the operator inputs the material lot number. The system then knows the lot numbers of each raw material that went into the final mixed product.

When LASI was notified by the FDA that contaminated rice protein was shipped to its facility, it was able to use lot numbers to search the database and determine in which final product orders the contaminated rice protein was used. LASI then notified its customers who received the contaminated final mixed product.

If this system were not in place, LASI wouldn’t know what batches had contaminated rice protein. It would likely know the contaminated bags were received on a certain date, but wouldn’t know exactly when they were used in the system. To be safe, it would have had to recall several weeks’ worth of shipped product.

Several years ago, Schenck Process implemented an automated batching system that gives LASI the flexibility to create custom ingredient blends for its customers with a high degree of quality and accuracy.

“The system creates electronic records for each batch detailing the actual amount of each ingredient in the batch, the storage bin from which the ingredient came and the information for the customer who will receive the blend,” says Nagely. “This information has proved invaluable for LASI’s quality control program and helps its customers with brand protection.”

How the right controls can reduce costs, increase throughput

Through process controls, Lortscher Agri-Service Inc. significantly decreased its energy usage, minimized risk and gathered hard data for optimizing operations.

Even though the pet food market has proven to be somewhat recession-proof, Lortscher Agri-Service Inc.'s (LASI) animal nutrition division knew it needed to take significant steps to manage its business through the economic downturn.

LASI noticed it was paying significant electrical utility fees each month for a demand rate tied to its peak power usage. To reduce these high operational costs, Brent Lortscher, president and project engineer at LASI, worked with Schenck Process to help guide the build out of the controls system. The project's goals were to deliver advanced process controls to maximize throughput, save energy, minimize risk and deliver hard data for trending and optimizing operations.

The result? Even in today's rough climate, LASI has experienced profitable growth.

Monitoring, reducing electrical usage

LASI delivers customized dry flour blends for 90 percent of the North American organic market. This super-

premium niche caters to pet food manufacturers that want to provide the best possible organic ingredients and advanced nutritional formulas. These processes require grinding, which consumes large amounts of energy.

The utility company calculates the demand rate based on the maximum amount of energy used during any 15-minute span throughout the month. LASI realized if its energy usage was spread more evenly and kept down during peak usage, its utility costs would drop.

Schenck Process controls group created real-time visibility into the plant's energy consumption. At LASI's request, the utility company installed a device on the utility pole to provide a signal to Schenck Process' PLC indicating real-time power usage. Schenck Process added current monitoring devices to LASI's hammermills—the largest motors in the facility

After analyzing the factory's utility bill, LASI realized it was indeed paying significant peak rate charges. As a result, the company had the utility company add a power



Brent Lortscher, president and project engineer at LASI, demonstrates how he can compare different material characteristics by displaying the hammermill power usage graphs for production runs manufactured weeks or months apart in the comfort of his own office.

meter to the facility's incoming 3-phase power. LASI and Schenck Process then worked together to develop a scheme for monitoring the incoming power and slowing down the two large mill motors when the power usage climbed too high. LASI was able to monitor its usage by using Wonderware Historian and ActiveFactory software packages.

"Wonderware Historian imports large amounts of process data to a database, and is particularly useful when analyzing variables, such as temperature, pressure, amps, voltage and production rates that change on a continual basis," says Mark Nagely, product sales manager, process controls at Schenck Process. "The ActiveFactory software provides a flexible front-end to the Historian database that allows users to view the data in various formats such as graphs and varying time spans. We have implemented similar systems for extruder controls to store ingredient feed rates to the extruder as well as the extruder zone temperatures and pressures."

Schenck Process controls engineers developed a system to capture the total power usage of the plant, as well as power usage and feed rate of each hammermill at regular intervals. This data, stored in a SQL server, can be graphed and displayed on any computer. Because the data is historical, Lortscher can view production run data from last night or from last month.

As with a typical milling application, the control system modulates the speed of the airlock to vary the feed rate of product into the hammermill to maintain the desired motor power usage. Schenck Process included additional logic to slow down the product feed into the hammermills to reduce energy consumption when peak energy usage gets too high.

"The ActiveFactory software was configured so the user can pick and choose which values to display on the trend screens and easily select the date/time span to view," comments Nagely. Anyone can see how the incoming plant power fluctuates as the material feed rate to the hammermills change. Users also can compare different material characteristics by displaying the hammermill power usage graphs for production runs manufactured weeks or months apart — from any LASI computer.

"Schenck Process has delivered great support. They set it up so it's a very friendly system," says Lortscher. "With our new controls, we've realized a five percent savings



Mac Process ActiveFactory software provides a flexible front-end to the Historian database that allows users to view data in various formats, such as graphs and varying time spans.

on our electrical bill — which paid for the project in about a year."

Alarms save significant time, energy

The original section of the LASI feed mill was built in 1979 with a 3-phase high-leg delta power system. The old system was manual and reactionary. When maintenance personnel suspected a problem, they took a multi-meter to the electrical room and checked the voltages. Sometimes the problem existed for a few hours before it was found.

Schenck Process implemented a Rockwell Automation PowerMonitor to continuously check the voltages on all three phases. The new system is automatic — eliminating the need to carry a multi-meter to the electrical room. Because the PowerMonitor is always connected to the electrical lines, any power problems are detected immediately and reported to plant personnel.

Now, Lortscher is able to see how often the hammermills are idling or when they are not grinding. New procedures have been implemented to ensure hammermills are turned off when not in use, adding to the energy savings.

"Our maintenance staff spends a lot less time tracking down what's going on, and can quickly get us back online," says Lortscher. "We've seen a big improvement with setting alarms that alert us when a mill is idling for three minutes. This alarm alone has reduced the amount of air we grind by up to 90 percent."

LASI now has the tools to determine the optimum hammermill feed rate for each product and can grind more quickly and efficiently.

Insight to run operations more efficiently, effectively

“Taking control of our hammermills delivers invaluable month-over-month trend history. We know how fast to feed the mill and how well it will grind various diets in various weather conditions,” says Lortscher. “It’s great having the facts at hand. When you have the proof, you can manage the process.”

LASI delivers 50 lb. bags and 2,000 lb. super sacks to pet food manufacturing customers for further processing.

“Our effort to get the most out of the mills has improved both the run speed and quantity of our batches,” says Lortscher. “We’ve squeezed efficiencies out of our systems and shaved a minute off our run time and increased batch amounts by 2,000 lbs. The rates we gained have a big impact on our ability to be flexible for production to deliver product just-in-time.”



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