PET FOOD FLOOR:

Dogged By Problems

One of the world's largest pet food manufacturers needed to upgrade the flooring in their Colorado facility because it was not pitched to properly drain.

BY JEN KRAMER

PHOTOS COURTESY OF INTERNATIONAL COATINGS, INC.

Did you know that the company that manufactures the M&Ms and Snickers bars that we love so much also manufactures the Pedigree food and Greenies treats that our four-legged friends love so much? Not in the same facility, of course. But the Mars food manufacturing company has us and our pets covered when it comes to beloved food items. They are internationally known for quality and consistency across their many brands. For this reason, when the flooring in one of their Colorado pet food manufacturing facilities did not meet their high standards of quality, they did not hesitate to call in experts to begin the repair process.

"The facility manufactures dog food in pelletized form," explains Norm Klapper, the manufacturer's representative for International Coatings, Inc., the coating ultimately specified for the project. "The process involves creating a cereal- and grain-based mash that is processed at high temperatures and then pelletized through a specialized press. The entire area is washed down in accordance with food-grade standards, incorporating Clean-In-Place (CIP) cleaning solutions that are chlorine- and caustic-based." As it happens, the U.S. Department of Agriculture (USDA) standards for pet foods are the same as those required for human food production (*Editor's Note: See "The Science Behind It" sidebar for more information*).

"They were having some drainage issues in their processing room," Klapper continues. "Mars had very recently taken over the aging food processing plant and needed to upgrade the facility to reflect its standards. The general contractor for the facility indicated that the floor was sloped to drain."

Klapper arranged to visit the site and make some recommendations. What he saw was a different "pitch" than the one he had been given. "The reason for their drainage problems was immediately apparent," he says. "The floor was flat. For any coating to work, the floor would first have to be pitched to drain."

Not surprisingly, the concrete substrate was in bad shape. Klapper describes the scene: "The concrete was in terrible condition. There was aggregate showing, and several areas had severe cracks."

The area with the worst damage was approximately 1,200 square feet (111.48m^2) located directly beneath the two pieces of production machinery that cut the pet food into pieces. "There were gaps around the equipment legs—areas that could potentially harbor contaminants," Klapper says. These machines could not be shut down for extended periods of time without bringing the entire plant to a standstill. "The entire 3,000-square-foot (278.71m^2)

International Coatings' Klapper says, "The concrete was in terrible condition. There was aggregate showing, and several areas had severe cracks

ABOVE ▲ The Behunin crew used Ingersoll Rand air saws, pneumatic chipping hammers, and scaling hammers to remove delaminated coating and unsound concrete.

floor, beginning about 35 feet (10.67m) out from the drain under the machines, had to be sloped," he continues. This meant that the project timeframe would be extremely tight.

The other consideration was the nature of the new coating to be specified. Since the processing room processed food (albeit pet food), the coating had to meet Food and Drug Administration (FDA) safety requirements and had to be "green."

Klapper and Mars knew that because of the complexity and time constraints of the installation, this was a job for Tom Behunin and Behunin Construction. "Behunin has more than 20 years' experience working with International Coatings and had the expertise and experience to handle a demanding job like this," Klapper says.

With the contractor on board, the owners decided to use International Coatings' epoxy system, ICO-Guard 51. Klapper explains, "It cures fast enough to be able to get on it the next day. It has excellent thermal shock- and chemical-resistance. It can be applied in virtually any thickness, all in one step, saving valuable downtime." It was the thickness that would come into play and make this job truly unique.

A BIG BUILD-UP

"The biggest problem was that the floor was absolutely flat," Tom Behunin echoes Klapper. "This was a wash area, and it wasn't sloped to drain. We had to move the drain 10' (3.05m) north of where it was and create a slope—but we had to do it using epoxy. There wasn't enough time to shut down the line and build up the floor with concrete. We were given three days, but we knew we could do it."

As it happens, the plant was open, but it would be shutting down the pet food processing line for the Labor Day holiday. Klapper, Behunin, and a 12-man crew hit the floor ready for one of the most intense epoxy jobs they'd undertaken—if not for the work itself, for the sheer amount of epoxy they would apply. "What was initially quoted as a ¼" (0.64cm) topping for an existing sloped floor turned into a one-step, 3" (7.62cm), ¼" (0.64cm) slope extend-

JOB AT A GLANCE

PROJECT:

Re-pitch, repair, and recoat 3,000 sq. ft. (278.71m²) of concrete flooring in pet food manufacturing facility

COATINGS CONTRACTOR:

Tom J. Behunin Construction, LLC
6114 Utica Street
Arvada, Colorado 80003
(303) 427-2018

SIZE OF CONTRACTOR:

A crew of 12 worked this project

PRIME CLIENT:

Mars Pet Care
Pueblo, Colorado

SUBSTRATE:

Concrete

SUBSTRATE CONDITION:

Old coating was delaminated; concrete was porous; floor was flat and having drainage issues

SIZE:

3,000 sq. ft. (278.71m²)

DURATION:

3 days

UNUSUAL FACTORS:

- Because the factory produces pet food, the machines could not be shut down for extended periods of time; the Behunin crew had exactly 3 days to complete the floor
- Tight time frame meant that concrete was not an option for sloping the floor as it wouldn't cure in time; specs called for the use of epoxy instead

MATERIALS/PROCESS:

- Use Visqueen to construct a three-sided tent for dust containment to protect the food production machinery from dust during demo
- Use diamond grinders, air saws, and scaling hammers to remove old coating, degraded concrete, and create a profile
- Clean concrete substrate with Bio-T sanitizer
- Etch concrete with hydrochloric acid diluted down to 20% with water
- Rinse floor with water
- Third-party plumber set new drains
- Use screed boxes and trowels, install ICO-Guard 51 epoxy, building up to 3" (7.62cm) high and sloping down to ¼" (0.64cm) at the drains

SAFETY CONSIDERATIONS:

- During surface prep, crew wore respirators with full face shields, gloves, boots, hearing protection, and hard hats
- During coating application, crew wore standard PPE including safety glasses, gloves, boots, and hard hats

ing from the edge of the building wall to the newly installed drain," recounts Klapper. That's 3" (7.62cm) of solid epoxy!

First, they isolated the processing room from the rest of the plant with plastic sheeting. They also created "a three-sided tent using plastic sheeting as dust containment to protect the machinery from dust when we did demo work," says Behunin. They protected themselves by wearing respirators with full face shields, gloves, boots, hearing protection, and hard hats.

With men and machinery protected, the crew used Ingersoll Rand air saws, pneumatic chipping hammers, and scaling hammers to remove the delaminated coating and any unsound concrete. "We used a wet diamond grinding process to cut the concrete, which limited the dust. Then a plumber came in to install the new drain," Behunin says.

When the plumber was finished, Behunin and his crew refilled any unsound spots on the old floor using back fill and tamping it into place. "There are no control joints in this monolithic floor," Behunin explains, "so we drilled ½" (1.27cm) rebar dowel into the concrete for reinforcement."

Next, the crew used Bio-T degreaser from BioChem Systems to clean and degrease the floor. "With the Bio-T, we remove the bio-hazards and prevent future delamination by exposing and cleaning the substrate," Behunin says. They poured the Bio-T into five-gallon (18.93L) buckets in a 20% solution mixed with hot water. This was then poured onto the floor and allowed to sit for the required two hours for complete disinfection. After a scrub with brushes, the floor was given another hot water wash. Then the floor was "acid-etched to create a clean, sound, and abraded surface," explains Behunin. "We use a 25% hydrochloric acid solution distilled down to 20% with water to etch the floor." Following a final hot water rinse, the floor was ready for coating.

THE ART OF THE PITCH

With a traditional floor, pitch is established with the concrete floor itself. The concrete is built up, sloped off, and tapered toward the drains. Made of mortar, sand, lime, and water, concrete is a far

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BELOW ▼ After a plumber had installed a new drain, Behunin and his crew refilled the trench using back fill and tamping it into place.

ABOVE ▲ "We used a wet diamond grinding process to cut the concrete, which limited the dust," Behunin explains. The hand-held grinders helped the crew access tight spaces.

more cost-effective media than epoxy. However, with this project, time was a huge consideration. In fact, time truly was money. They simply could not afford to have the pet food processing line out of commission for the 28 days or more that it would take for the new concrete to cure. In the long run, it was more cost-effective for them to build up the floor using high-tech coatings. An unusual move, to say the least.

"To create the slope," Behunin says, "we had to build the floor up to a thickness of 3" (7.62cm) in some places, tapering down to ¼" (0.64cm) at the drain. The ICO-Guard 51 is self-priming, so once the concrete was clean and prepped, we could start coating. We didn't have to wait for a prime coat to cure."

Establishing a mixing station, the crew warmed the International Coatings' ICO-Guard 51 epoxy to 85°F to 95°F (29°C to 35°C), and mixed the three-part epoxy in a mortar mixer. Then, using a screed box and armed with trowels, they began applying the resin-rich, 100% solids epoxy onto the floor, one ¼" (0.64cm)

VENDOR TEAM

BIOCHEM SYSTEMS
Surface prep
PO Box 8098
The Woodlands, TX 77387
(880) 777-7870
www.biochemsystems.com

INGERSOLL RAND
Surface prep equipment
www.ingersollrand.com

INTERNATIONAL COATINGS INC.
Coatings
2925 Lucy Lane
Franklin Park, IL 60131
(800) 624-8919
www.internationalcoatings.com

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coat at a time.

In a further time-saving step, "we hand-broadcast 20-grit sand to excess into the wet material to create a non-skid surface," Behunin says. "Because we broadcast the aggregate directly into the coating, no topcoats were necessary."

And that was it. Three days after arriving at the problem-dogged floor, Behunin and his crew turned the epoxy-protected, Grade A food-processing room back over to the owners. Klapper explains, "The plant manager was very satisfied with the completed project. The owners were very impressed with the quality of the materials and the workmanship that Behunin and his crew provided. Their drainage issues on the floor are now solved."

Behunin sums up the unique project with a nod to the combination of the right product and his fast-moving, skilled team. "It was pretty intense," Behunin says. "We used 350 units of epoxy in three days. We could have covered a 7,000-square-foot (650.32m^2) floor with what we used on 3,000 square feet (278,71m^2)." CP

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LEFT ◀ The crew used a screed box and trowels to apply ICO-Guard 51 onto the floor, hand-broadcasting 20-grit sand to excess into the wet material to create a non-skid surface.

THE SCIENCE BEHIND MAKING PET FOOD SAFE

By Jen Kramer and Norm Klapper

We know that the FDA has strict guidelines when it comes to the manufacture of food for human consumption, and it stands to reason that those guidelines are no less rigorous when the food involved is intended for our pets.

This meant that in the Mars pet food-processing room, there could be no standing water, no cracks or crevices, and no compromised or porous concrete that could retain contaminates or bacteria in any proximity to the food-processing equipment. (Title 21, *Code of Federal Regulations*, Part 113, abbreviated as 21 CFR 113, www.fda.gov).

Mars is known for their quality pet food. They needed to maintain that high standard and recoat the production room with a coating that would both meet the project's unusual demands and also meet FDA approval. They did so. And it wasn't just the coating that was "green"—the cleaner/degreaser was, too.

From Beer To Dog Food

As the company Website recounts, BioChem Systems' line of products had an interesting beginning. The company's owners got a request from Bill Coors to find a replacement for the hazardous and lethal vapored 1,1,1 trichloroethane (TCA) that was used for cleaning at the Adolph Coors Packaging Division. Located in Golden, Colorado, the Coors Packaging Division manufactures in excess of 4 billion two-piece aluminum cans per year for use in the packaging of Coors' beers. They used 1,1,1 TCA to clean oils from machinery, floors, and tools. The challenge was to develop a cleaner/degreaser that cleaned as well as, or better than, 1,1,1 TCA and was also biodegradable and safe for workers and the environment. The product could not contain chlorinated solvents, petroleum products, acids, caustics, or other hazardous chemicals. After a year of research, lab testing, and field evaluations, BioChem Systems developed a product that was eventually named Bio T—the cleaner/degreaser used on the Mars pet food-processing floor. The product formulation met all the objective criteria required of an environmentally friendly and worker-safe product. Given a USDA Class C rating, Bio-T has been used for years in meat-packing facilities to clean animal fat from large processing areas. The non-toxic, non-corrosive formula is 100% biodegradable and water-soluble. And this gentle but tough degreaser was step one in the two-step green coating process for the pet food-processing room floor.

Step Two: Green And Tough

Norm Klapper with International Coatings states that "ICO-Guard 51 was chosen for its chemical resistance, ability to be applied in any depth in one application, fast cure time, resistance to thermal expansion, and overall performance record in similar applications."

A three-part, flexibilized epoxy, ICO-Guard 51 is a USDA-approved product with zero odor and zero VOCs. The resin-rich, 100% solids mix creates a coating in any thickness that can be applied by hand or power trowel in a single step without harm to the environment.

As Klapper knew, ICO-Guard 51 is particularly recommended for meat and poultry plants, dairies, citrus, and bottling plants—areas exposed to heavy wear and a broad pH range down to 1 as well as daily exposure to sanitizing wash-downs with water up to 212°F (100°C).

ICO-Guard 51 provides an easy-to-clean, seamless surface for institutional and commercial kitchens, and it can even be installed over old quarry tile or brick floors, provided the tile is well bonded. In its "fast cure" and "cold cure" versions, it is well suited for application in coolers and cold rooms without contamination of sensitive food products.

Unlike most epoxies, ICO-Guard 51 is formulated to withstand extreme thermal shock, including steam cleaning. As opposed to more brittle, conventional epoxies, with compressive strengths typically exceeding 10,000 psi, or three times that of concrete, ICO-Guard 51 is formulated to have properties closer to that of concrete with a compressive strength of about 5,200 psi. The resin-rich system is much more durable and flexible than other resinous toppings, thus extending the life of the concrete substrate.

ICO-Guard 51 has excellent chemical resistance against industrial cleaners, most inorganic acids, (including up to 80% sulfuric, 85% phosphoric, 30% nitric, concentrated hydrochloric [HCI]), and organic acids (80% lactic), caustics, lubricants and some solvents—an important consideration given the constant cleaning to which the pet food-processing floor is subjected.

And at the end of the day—or in this case—three days, the USDA-approved epoxy took the place of concrete, curing in a fraction of the time, and providing seamless, slip-resistant coverage. Now, as Tom Behunin of Behunin Construction says, "the coatings in the processing room are all USDA-approved, everything is sanitary." CP