

# CASE HISTORY

## *There is no emergency—loss-in-weight feeders save fire-resistive materials manufacturer*

*A manufacturer of spray applied fire-resistive materials upgrades from volumetric to loss-in-weight feeders for improved process and quality control.*

*Isolatek International*, headquartered in Stanhope, N.J., has more than 40 years of experience manufacturing dry and wet spray-applied fire-resistive materials. Used as a fire barrier, these materials are sprayed onto steel beams, columns, joists, and roof and floor assemblies during the construction of commercial buildings. To produce these fire-resistive materials, Isolatek used volumetric feeders to feed the major ingredients to its mixers, until 1999, when the company decided to upgrade to loss-in-weight feeders for improved process and quality control.

### **Producing dry spray-applied fire resistive materials**

The dry spray-applied fire-resistive materials are used like this: At a construction site, the dry material is pneumatically conveyed to a nozzle that's connected to a water line. When it reaches the nozzle, it mixes with the water, which activates the material's binders as the material is sprayed onto the building's structure. Isolatek manufactures its dry spray-applied fire-resistive materials at its plant in Huntington, Ind. The mineral-fiber-based dry spray is produced from steel-mill slag blended with different powdered binders. The company buys the dry spray ingredients in bulk and stores them in silos. From the silos, each ingredient goes to a series of holding hoppers above a series of feeders. In the past, the ingredients were continuously moved into the feeders at different rates (depending on the blend required for the particular dry spray being manufactured) and volumetrically metered into the mixers.



**To improve process and quality control, Isolatek upgraded from volumetric to loss-in-weight feeders at its Huntington, Ind., site, where the company manufactures dry spray-applied fire-resistive materials.**

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For 20 years, Isolatek manually performed hourly rate checks to track and control the process. An operator would capture and weigh material from each volumetric feeder's feedstream. Then, depending on the results, the operator would adjust the feeder's speed. For quality control purposes, the company would compute how much material was actually used during a given period by manually tracking the receipt of raw materials and the ongoing inventory. From this information, the company could yield a historical trend, but not complete inventory results. This led to process-control fluctuations. As a result, the company decided to see what kind of technology could update its feeders.

Tom Lund, manufacturing manager at the Huntington site, explains his goal for updating the process: "We wanted to improve the accuracy of our blend and our ability to record process data. We believed that loss-in-weight feeding, where the feeders actually weigh the material that goes into the mix, would be a much more accurate and reliable method."

## Finding an appropriate feeder

Familiar with Acrison, Moonachie, N.J., a supplier of volumetric and loss-in-weight feeders, continuous blenders, bin dischargers, and related control systems, Lund inquired about using loss-in-weight feeding to improve his process's blend accuracy and gain tighter process control. The feeder supplier said that loss-in-weight feeding would achieve these goals; in the appropriate application, loss-in-weight feeders offer better feedstream control than volumetric feeders, resulting in improved metering accuracy. In addition, and unlike volumetric feeders, loss-in-weight feeders also provide statistical process control, enabling constant feeder performance monitoring.

The company shipped about 3,000 pounds of the various powdered binders for testing to see which feeders would be a match for the application. The tests would determine the optimum metering mechanism for each material, as well as auger size and type, scale type and capacity, and other design criteria.

The supplier successfully proved how the feeders with the appropriate design features could properly handle the spray-applied fire-resistive material ingredients, and Lund purchased a series of loss-in-weight feeders for the Huntington site.

## The loss-in-weight feeders

Each of these loss-in-weight feeders consists of a hopper and an auger-type feeding mechanism mounted on a counter-balanced scale. The scale's all-digital weight sensor is non-load-cell-based. The feeder's entire weighing mechanism, including the weight sensor, is factory-calibrated, adjustment-free, and impervious to shock, overload, and other disturbances. The feeder's continuous metering accuracy ranges from  $\pm 0.25$  to  $\pm 1$  percent or better at 2 sigma, based on a given number of consecutive 1-minute weighments.

An individual microprocessor-based controller monitors each feeder. A master rate controller interfaces with each individual controller, coordinating the operation of the feeders. The controllers are interfaced with Isolatek's database through PCs, so operators can perform all data recording automatically.

To meter the dry-spray ingredients, an Isolatek operator simply sets each feeder for the ingredient feedrate that that day's product blend requires. As the ingredients feed, each feeder's scale continuously monitors the resulting decrease in weight from each hopper. Each controller simultaneously computes the weight loss and compares the information to the specific feedrate values the operator entered. The controller then adjusts the feeder output to maintain the desired feedrate. The master rate controller ensures that all feeders are operating precisely and at the correct proportions. If an individual feeder deviates from the preset feedrate, the controller sounds an alarm to alert the operator. If the operator doesn't respond, the controller shuts down the system to prevent an off-spec blend.

## Positive results lead to more plant upgrades

Three years ago, during a maintenance shutdown, Isolatek's employees worked with local contractors and the supplier's service technician to install the feeders. It took about a week. Since then, the company's dry spray-applied fire-resistive material manufacturing process has greatly improved. Lund says, "Our weighing accuracies and material tracking are much improved. Because we can interface the feeders with our plant database through our PCs, we can automatically report and track our material usages. It also helped us get our ISO 9001 certification."

Lund is also pleased with the feeders' minimal maintenance. He says, "We've learned what we need to watch and maintain. We need to keep the feeders clean and we have to keep up with each one's fill system. We also monitor wear on each feed screw."



**Because the loss-in-weight feeders were a proven success in Huntington, Ind., Isolatek also made the switch at its Stanhope, NJ., sift where the company manufactures wet spray-applied fire-resistive materials.**

It was this minimal maintenance and proven success at Isolatek's Huntington site that led the company to make the switch at its Stanhope, N.J., site. There, Isolatek produces its wet spray-applied fire-resistive materials. With the wet spray, a user dumps a dry premix from its bag and blends it with water in a mixer. The resulting slurry is pumped to the construction site, where air is added at the nozzle, atomizing the material as it's sprayed onto the steel structure.

Since 2000, Isolatek's Stanhope site is using loss-in-weight feeders to meter its main ingredients. Jim Verhalen Jr., manufacturing manager for Isolatek's wet spray-applied fire-resistive materials, explains: "With the volumetric feeders we had to balance everything with timing and the difference in all the densities of our ingredients. There was a possibility we could end up with fluctuations in our bag weights. Switching to loss-in-weight feeders for our key ingredients has enabled us to get better control over our process."

The switch has also improved the company's inventory control. Verhalen says, "When we recorded our process data with the volumetric feeders, we manually noted each ingredient's inventory level before and after shifts and at the beginning and end of the week. This gave us gross numbers. Today it's recorded automatically, sometimes hourly, with our loss-in-weight feeders."

Isolatek didn't stop there. After opening a third plant in Houston, the company installed more of the supplier's loss-in-weight feeders to meter the ingredients for its spray-applied fire-resistive materials manufacturing process.

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