

How to Reduce Noise

Gallagher Materials strives to become a better neighbor by rebuilding its Joliet plant

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Fines control is a big issue in Illinois. HMA plants must weigh the material coming out of the bag house cleaning system, divert it into a storage silo, then feed the prescribed amount of fines back into the mixing drum.



Asphalt plants continue to face challenges as new regulations are created. Whether faced with air quality requirements or noise reduction options, asphalt plants must continue to make the appropriate upgrades to meet regulations. Gallagher Asphalt Corporation is one company that has successfully enhanced its facilities to meet the growing requirements.

Currently, Gallagher is in its third generation of ownership and was founded in 1928 by James Gallagher. It operates three plants in Illinois located in Thornton, Joliet and Bourbonnais. Thornton is the headquarters of the operation, and it is located on one of the largest limestone quarries in the country.

With the three plants, Gallagher's largest customer is its own paving crews with up to six or seven crews working at any given time. "We also sell to various other contractors doing paving work from large parking lots to single driveways," says Jim Trost, vice president of operations.

The customers of Gallagher Asphalt include Illinois Department of Transportation, Chicago Department of Transportation, Illinois Tollway, Cook County, Will County and several local municipalities and government agencies. Gallagher Asphalt also serves the private paving market working for developers or other general contractors.

Before the downturn in the economy, Gallagher was producing an average of about 800,000 tons of hot mix asphalt (HMA) per paving season, with a few seasons peaking around the one million ton mark. In 2011 the plants produced right around 500,000 tons.

The majority of mixes the Gallagher plants produce are standard 30, 50, 70 and 90 gradation Superpave mixes with reclaimed asphalt pavement (RAP), but they also produce recycled asphalt shingles (RAS) and warm mix asphalt (WMA) mixes.

"RAP is used in over 95 percent of the mixes we produce," Trost says. "About 20 percent of the mix produced contains RAP and RAS, but that number is growing." The amount of mix incorporating WMA is also growing, and Gallagher has completed two projects using WMA additives.

"We've seen very good results from the WMA mixes we've produced and tested with the Hamburg wheel rut testing equipment," Trost says. "Two of the three plants



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are equipped with WMA foaming capability. Gallagher's Thornton plant is a Gencor plant and uses the Gencor foaming system and the Joliet facility utilizes an Astec Green foam system."

Fines control

Gallagher's plants have also received upgrades for a better fines control in the HMA mixtures. "Fines control has been a big issue in Illinois," Trost says. "To control our mix fines we are required to have a Positive Dust Control System (PDCS)."

In Illinois, HMA plants must weigh the material coming out of the bag house cleaning system, divert it into a storage silo and then feed the prescribed amount of fines back into the mixing drum.

Many HMA plants simply return the bag house fines directly to the mixing drum instead of this type of PDCS.

"Bag house cleaning systems don't discharge material at a constant flow rate," Trost says. "We proved this to ourselves by tracking the flow rate of the bag house fines being discharged from the cleaning system



over several cycles of cleaning. Different areas in the bag house get loaded heavier than others, resulting in the variation of fines flow during a cycle. Inconsistency of virgin aggregate fines can also affect the amount of fines collected. Startup, transition and shutdown procedures can also add to the variation in mixture fines."

According to Trost, Gallagher weighs the fines discharged from the bag house in a weighpod, a collection vessel supported on loadcells. "Then, materials are pneumatically conveyed to a storage silo. Our control system corrects for the material removed. Under the fines storage silo we have another weighpod and variable speed vane feeder to allow us to meter a consistent

flow of fines back into the mix. The correct amount of fines to meter in is determined by our mix designs and quality control test results," Trost says.

This system requires more equipment and control, but Trost believes it gives a more consistent mix.

"We are required to use the system for any HMA produced for IDOT, but we are so convinced of the benefits of this system that we use it for 100 percent of the mixes we produce," he says. "In addition to the consistency of mix, the equipment runs more reliably when we use it continuously."

New Joliet plant

While improvements have been made to the existing plants in Thornton and Bourbonnais, the Gallagher Joliet plant was recently upgraded. The Joliet plant and property was originally purchased by Gallagher in the 1970s. In 1990, a 350 ton per hour (tph) Astec Double Barrel plant was purchased to replace the original batch plant. This site is in Will County, an area that had seen rapid growth throughout the 1990s and early-mid 2000s.

Struggling to keep up with product demand, Gallagher upgraded the facility to a 500-tph Astec Double Barrel plant. "The new facility was planned and designed starting with a clean sheet of paper. Our key considerations throughout the process were safety, productivity, reliability and being environmentally friendly all while keeping the



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initial cost within budget," Trost says.

With the changes, Gallagher now had a larger drier/mixing drum and burner system for an increased production rate. The burner is capable of firing on natural gas or used oil. The new plant also includes a greater aggregate storage capacity including eight cold feed bins and two RAP bins.

"Previously we only had six cold feed bins and a single RAP bin," Trost says. "The two RAP bins also gave us the capability to incorporate RAS into our mixes. We have

five, 350-ton HMA silos with the new plant set up for long-term storage that gives us lots of capacity to store mix and get ahead of crews on high-production days."

The new Joliet plant has two 900-barrel fines silos that can store fines collected from the bag house or store virgin mineral filler to be added to mixes. The fines feed system includes two sizes of vane feeders to cover a large range of flow required by different types of mixes and a range of production rates.

The plant includes a new tank farm with concrete secondary containment for the three 35,000-gallon liquid asphalt storage tanks, one 20,000 gallon used oil burner fuel tank, and a skid-mounted AC pump system, calibration tank, additive tank, hot oil system and burner fuel pre-heater system.

Noise reduction

A lot of effort was put into the design of the plant to be flexible yet as simple as possible, with a big emphasis on noise reduction.

"We put the plant in a different area of the yard at Joliet so we could improve the traffic flow in the yard, and also to allow us to complete the construction of the plant while maintaining the operation of the existing plant," Trost says. "We began construction in late 2008, and during the 2009 season we had both plants running until we could complete the IDOT certification process for



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the new plant. Then in 2010, we dismantled the old plant and sold it.”

Several design improvements of the new plant focused on reducing noise. “Our Joliet facility is located with a mixture of residential and industrial neighbors,” Trost says. “With the old plant, we occasionally received complaints from our neighbors about the noise during the operation of the plant. As a result, we worked hard with Astec in the design phase of the project to eliminate this concern for our neighbors.”

One area of noise complaint originated with the slat conveyors associated with the HMA silo storage system. As with HMA plants, the big conveyor is always running as were all four transfer conveyors on top of the silo system giving the operator the ability to divert material from one silo to another when changing mixes or filling silos.

“You had five conveyors running, plus the chain drive system that would generate a lot of noise,” Trost says. “With the new plant we installed a rotating batcher system. We have the main conveyor drive chain in a sealed housing and an oil bath to keep the chain lubricated and running quiet.”

With the rotating batcher system, Gallagher reduced the number of conveyors on top of the silos from four to one. There are only two batchers to service the five silos. The single transfer conveyor pivots around the middle silo and rides on a curved rail to provide a radial feed to the other four silos. “Not only has this change resulted in reduced noise, but it was less expensive initially, is less expensive to maintain, and requires less horsepower,” Trost says.

Another key area for noise reduction was the Double Barrel dryer/mixing drum. “The Astec Double Barrel plant is typically chain driven,” Trost says. “The chains on the drum drive create noise. We went to Astec and asked them to consider building this plant with a trunnion drive system. They were cautious, but agreed to try it out. The results have been very good. Not only is the drive much quieter, but it requires less maintenance and housekeeping is improved with no chain lubricant residue.”

The drum burner was another loud area of the old plant.

“We had sound walls strategically located to try to dampen the sound from the burner area,” Trost says. “With the new plant we went with Astec’s Phoenix model,

a totally enclosed burner. The blower that provides air for combustion for the burner is powered by a variable speed drive.

The drive only runs the blower at the speed required for the amount of heat you need from the burner, whereas the old plant burner blower ran at full speed all the time. This burner runs so quiet it’s often difficult to determine if it is running or not.”

A variable speed drive system for the exhaust fan was also chosen to reduce noise. The exhaust fan only runs the speed necessary to provide the amount of air needed for the system.

In most older plants, the exhaust fan runs at full speed and the volume of air is controlled with a damper. The new system runs quieter and eliminates a separate damper and associated moving parts and maintenance requirements, according to Trost.

Other typical sources of noise with HMA plants include the plant air compressor and the positive displacement blower for conveying fines removed from the bag house. “You have to blow the fines from the bag house up into the storage silo. These blowers tend to be very loud when they operate,” Trost says. “Both our plant air compressor and the fines transfer blower at the new plant were placed inside sound enclosures engineered to drastically reduce the noise while allowing cooling for reliable operation.”

For simplicity and reliability, Gallagher also worked with Astec to minimize the number of augers required to move fines in the plant. Other than the bag house hopper auger, the plant has two augers.

Environmental aspects

In 2010, Gallagher’s Joliet plant received the National Asphalt Paving Association’s Ecological Award. The Joliet plant has several features designed to be environmentally



The plant includes a new tank farm with concrete secondary containment for the three 35,000-gallon liquid asphalt storage tanks.

friendly. “We did some very extensive landscaping between the road and the new plant,” Trost says. “We put up a berm where the new plant is located so a lot of the plant is out of view of the public and the noise associated with truck loading is screened from the neighbors.”

Another enhancement is the paint scheme selected for the new plant. “We used neutral, beige tones to blend the plant with its surroundings,” Trost says. “We also paved the area around the plant to keep dust from the truck and loader traffic down.”

Ultimately, Gallagher found success in its efforts taken to build a plant with such enhancements. “The project was a big undertaking, but putting in the extra effort up front to spec out the things we wanted to make this a flexible, productive, efficient, reliable and environmentally friendly facility and HMA plant definitely paid off,” Trost says. ■