Noise Enclosures Bring Sound Levels into Compliance

BY BOB SHIPE

Rotating machinery often produces high levels of sound that are easily identified as point sources of noise in a facility. The machine design, materials being processed, and location of equipment are all factors contributing to an objectionable noise level.

Noise attenuation for isolated sources is most often addressed with either steel or curtain sound enclosures. These sound enclosures are rooms built around the process. Enclosure design is dictated by overall sound levels, the band frequency analysis, enclosure application and machinery maintenance requirements.

SysTech Design completed two industrial noise control projects with steel walled enclosure solutions having slight variations. The projects required isolation of a hammermill and a planer with both having sound levels around 90 dBA but with differing frequency bands that needed attention.

Pulse-clean baghouse, featuring 192 bags on thermal reclaim system

Industrial Noise Enclosure Designs

A well known pet food and supply manufacturer contracted SysTech Design to assist them with an ongoing noise issue with a hammermill. Their process consisted of recycling old newspaper and magazines for dog bedding. The hammermill was used to shred the paper products into a smaller useable size. The hammermill emitted a very low frequency sound at the 250 to 500 Hz range and around the 90 dB level. This was very disruptive to the operators and other workers within the facility.

After a detailed analysis of the process and considerations regarding the difficulty of attenuating low frequency sound, SysTech Design offered a rigid panel enclosure consisting of 4 sides, a roof and walk in space. Each panel is 4" thick and has a solid 18-gauge exterior, 4" thick layer of acoustical rock wool and a 22-gauge perforated steel interior surface. The enclosure provided a 19 dBA reduction in sound level in the 500 HZ frequency band. Problem solved!

Foundry Extends Baghouse Life by a Factor of 6!

PLEATED BAG FILTER DESIGN DOUBLES PRODUCTION RATE

SysTech proposed to retrofit the baghouse with Donaldson Torit's pleated bag technology, using their patented SpunBond® filter media. Due to the traditional sock style footprint of the pleated bag, coupled with the cartridge filter-like design, the pleated bags offer four times the filter media found in a standard polyester bag. This allows the baghouse footprint to remain the same, while greatly increasing the filtration efficiency. The end result is increased square footage of filter media, from 3619 to 8697 square feet, which provides a much lower air to cloth ratio. Simply put, the increased media lowers the face velocity on the filters thus preventing dust impaction, this results in easier, more effective, release of particulate from the filter surface. Because of the sand binders, the pleated bags were sprayed with a hydrophobic/oleophobic coating, giving them increased resistance to the moisture and oils that are present in the dust. The SpunBond® pleated bag media was designed to withstand the 265°F airstream temperature present in the baghouse.

Fully loaded standard polyester filter bag, image shown is after

SIGNIFICANT ADVANTAGES OF PLEATED BAG TECHNOLOGY

Results of the Pleated Bag retro-fit:

- *Increased Production: The foundry's heat treating process is now able to operate 24/7 allowing for a 100% increase in production, with no limits on dust collection system run time.*
- *Decreased Pressure Drop: The operating dust collector pressure drop fluctuates between 1.5-2.5" wg. with intermittent pulse cleaning as necessary.*
- *Increased Filter Life: Using the pleated bag technology, the lifespan of the bags has increased from 4 weeks to 6 months.*
- *Decreased Downtime: The foundry was previously forced to work one hour on, one hour off, due to the baghouse pressure drop quickly reaching its high set point. Since the pleated bags have been installed, there are no restrictions on how long the foundry can run.*
- *Quicker/Easier Bag Change Out: Previously, a baghouse filter change out required the manpower of two people, for two days, due to the time required to replace the existing two piece polyester sock and cage style filters. The new one piece pleated bag design allows two people to complete a 192 bag change out in just 4 hours.*
- *Significantly Less Compressed Air Demand: Previously, the baghouse pulse cleaning system was used continually to try and overcome the misapplied polyester filter media. With the new pleated bags, the cleaning system is only in use intermittently and the compressed air requirement is 60 PSI per pulse, rather than the 90 PSI per pulse requirement for the polyester bags.*
- *Manufacturer's Guarantee: After analyzing the dust sample, Donaldson issued a bag life guarantee of 4000 operational hours or one year of service.*
- *Cheaper than a new collector: The capital cost of the retrofit was 21% of the cost of a new dust collector!*