

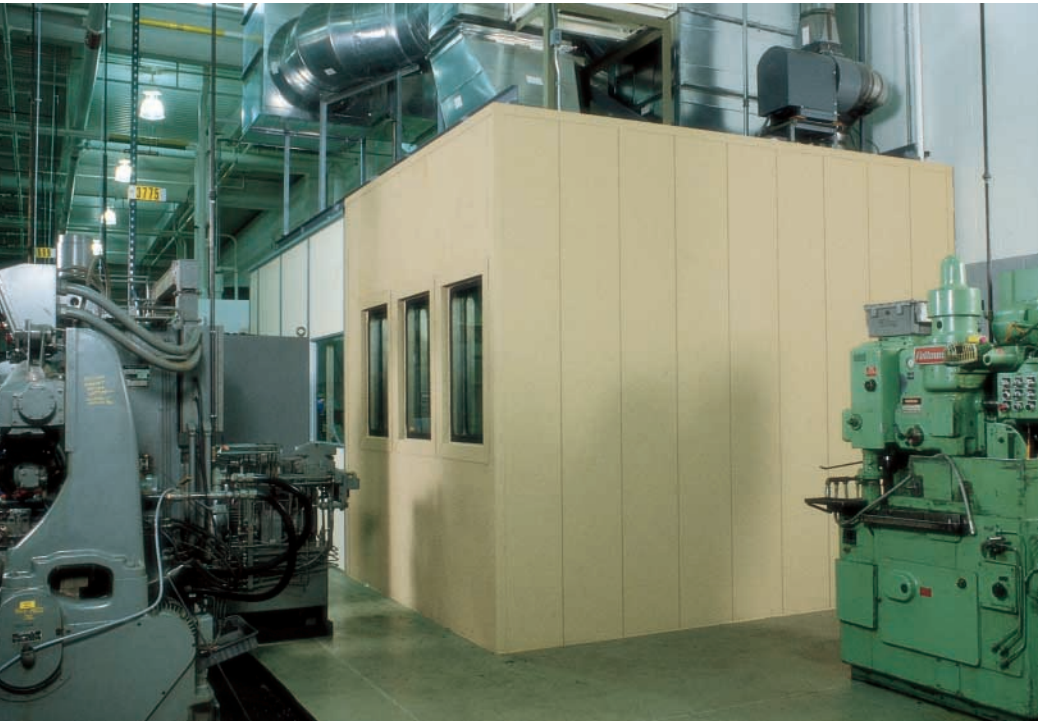
Attenuations

Providing noise control solutions for industrial applications.

McGill AirSilence LLC

An enterprise of United McGill Corporation —
Founded in 1951

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One of two SOUNDSCREEN™ acoustical enclosures that serve as dynamometer test booths and enable Harley-Davidson to meet noise control standards stricter than those required by OSHA.

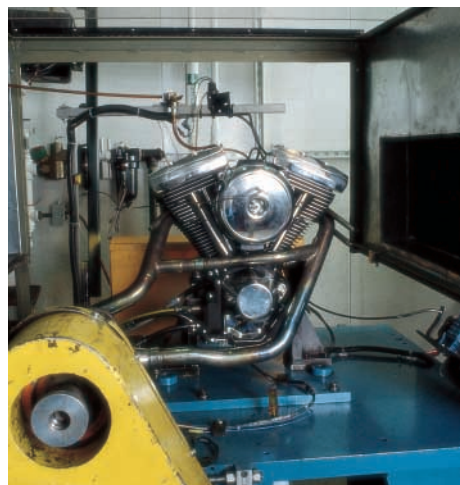
The Occupational Safety and Health Administration (OSHA) regulates noise in the workplace. Its standards are intended to make sure that workers are not exposed to noise levels loud enough to cause hearing damage. But some companies go even further toward providing a comfortable work environment, setting noise standards that are stricter than OSHA's.

The Harley-Davidson Motor Company has strict noise control standards at its manufacturing plant in Milwaukee, Wisconsin, where it machines, assembles, and tests engines and transmissions for its motorcycles. Testing the engines is one of the noisiest parts of the job. Every day, randomly selected engines are tested on dynamometers by running them for 5½ hours at speeds reaching their full horse power capability.

Recently, Harley-Davidson decided to convert the plant to a focus factory with a subplant for each product line. The conversion required relocating two dynamometer test rooms. Because the cinder block walls that housed the test equipment could not be moved, new enclosures would have to be built. The test rooms

were to be relocated near assembly lines and workers, so noise control would be even more important than before.

The first possibility considered was building new cinder block enclosures. One drawback was that a cinder block structure would be permanent, whereas



Harley-Davidson tests motorcycle engines by running them for 5½ hours at various speeds.

Harley-Davidson wanted the option of being able to move the dynamometer test equipment and enclosures in the future. Another drawback was the appearance of the bare cinder block walls. Harley-Davidson wanted the restructured plant to look good, both for its workers and for the many visitors who tour the plant.

But the biggest problem was noise reduction. When an engine is tested at top speed, the noise level 3 feet away from it ranges from 109 to 111 dBA. Outside the cinder block enclosures, the engine noise was measured at 81 to 83 dBA. Although that met OSHA standards, the company wanted to improve on it. Ken Antaramian, senior manufacturing engineer for Harley-Davidson, explains, "I didn't want our operators to need additional hearing protection. Our goal was to drop the noise to 73 to 76 dBA, so that ear plugs would not be required."

In search of a better way to reduce the noise, he contacted McGill AirSilence, which manufactures SOUNDSCREEN™ panel systems for use as acoustical enclosures and barrier walls. The double-wall steel (or aluminum) panels are filled with

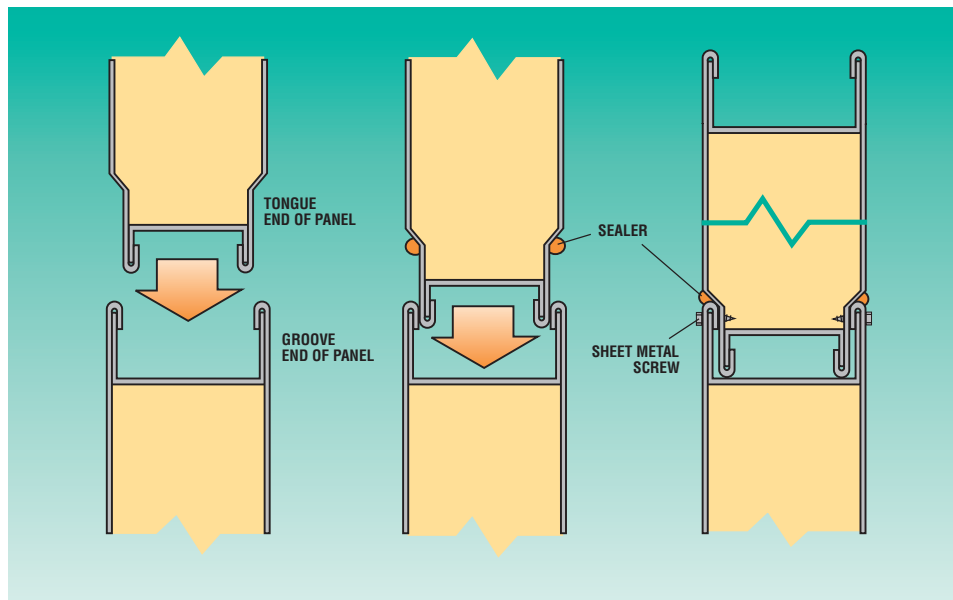
thermal/acoustical insulation. Components are designed and manufactured to meet the needs of individual applications. They are easy to assemble into a durable unit that provides effective sound attenuation.

McGill AirSilence worked with Jim Riddle of Hering & Associates, its manufacturer's representative in Mequon, Wisconsin, to develop a solution for the noise problem. An acoustical analysis indicated that a SOUNDSCREEN enclosure with 4-inch-thick insulation would reduce the engine noise to about 73 dBA.

"It was right where we wanted to be," says Ken Antaramian. "We looked at the numbers and everything seemed doable."

With the noise control issue settled, it was time to develop an enclosure design that would meet the plant's other requirements. The design team included McGill AirSilence, Hering & Associates, Harley-Davidson's engineers and operators, and Bane Nelson, an industrial and commercial contractor in Wisconsin. After discussing the options, they came up with a customized design that satisfied everyone.

McGill AirSilence supplied two SOUNDSCREEN enclosures, each measuring 10 feet wide by 12 feet long by 10 feet high. A pair of 72-inch by 84-inch doors are built into each enclosure to allow easy access to the dynamometer test area. The doors open into an adjoining audit room, where the dynamometer test operators work. A window in each door allows the operators to observe testing from the quiet environment of the audit room. Three double-pane windows are built into one of the outside walls of each enclosure to pro-



Tongue-and-groove connections made the SOUNDSCREEN panel systems easy to assemble. If desired, the enclosures can be taken apart and reassembled in the future.

vide tour groups with a view of the engines being tested.

The SOUNDSCREEN panels are constructed with tongue-and-groove connections. Once a framework was assembled, the tongue-and-groove edges were slid into place and the connections were fastened with sheet metal screws. Acoustical caulking was then used to seal the joints on the outside surface of the enclosure. The tongue-and-groove design makes it possible to take the enclosures apart and reassemble them in different locations.

Concerning the installation, Larry Nelson, vice president of Bane Nelson,

says, "It was a breeze—much easier than we thought it was going to be. The whole thing took about 3 days."

The assembled enclosures were covered with a steel facade, supplied by Bane Nelson and Butler Manufacturing Company, with a factory-applied textured finish that provided an attractive stucco appearance. Structural steel beams and columns were installed inside the enclosure to support a mezzanine for HVAC fans and ductwork on the enclosure's roof. The HVAC system provides ventilation and makes it possible to simulate conditions faced by a motorcycle traveling at up to 60 miles per hour on the highway.

Once completed, the SOUNDSCREEN enclosures enabled Harley-Davidson to protect its workers from the engine noise. Sound measurements were taken when the first enclosure was installed. At 5,600 rpm the average sound power level was approximately 74 dBA outside the closed door of the test booth and approximately 57 dBA outside the north wall of the enclosure. The result was considerably greater noise reduction than OSHA required.

"The project was designed and developed in a short period with excellent results," says Ken Antaramian. "We wanted to meet the needs of our employees for a safe sound level, be within budget, and meet the time constraints—and that's what we achieved."



Ken Antaramian (left), senior manufacturing engineer at Harley-Davidson, and Larry Nelson (right), vice president of Bane Nelson, wanted to provide a quiet work environment in the audit room adjoining each test booth.

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