

# Innovation in Performance Sound at The Shaw Festival

By: Alan Hardiman

## A novel approach to amplification of musical instruments yields remarkable results

In this its 50th season, the Shaw Festival's production of Lerner and Loewe's beloved *My Fair Lady* is a light and lively affair that gives audiences an affectionately nostalgic view of much simpler times—and on more than one level. While the original 1956 Broadway production looked back through rose-colored glasses some 50 years to Edwardian London, the current production adds another retrospective half-century, hearkening to a time when the lyrics to “A Hymn to Him” could be sung without a trace of the consciousness raised by the women's rights movement.

Taking account of this heightened sensitivity, director Molly Smith has tweaked the production with a more-than-occasional wink at the audience in the solid performances of Deborah Hay's Eliza Doolittle, Benedict Campbell's misogynistic Henry Higgins, and a wonderful supporting cast. Set designer Ken MacDonald's whimsical motif of gilded bird cages is a deft touch that adds a sense of both light and lightness, all the while implying the restrictions of the characters in their respective classes.

After all these years, *My Fair Lady* still triumphs, no more so than with the classics “On the Street Where You Live,” “I Could Have Danced All Night,” “Wouldn't It Be Lovely,” “Show Me,” Get Me to the Church on Time,” and “With a Little Bit of Luck.”

Musical director Paul Sportelli turns a 15-piece orchestra beautifully to the task, with clarity and dynamics that belie the use of sound reinforcement. Better yet, the amplified orchestra



Deborah Hay as Eliza Doolittle and Mark Uhre as Freddy Eynsford-Hill in *My Fair Lady*.

never once gets in the way of Alan Jay Lerner's lyrics, which do so much to advance the story.

Traditionally, the Shaw Festival had mounted its musicals in the 328-seat Royal George Theatre, one of two smaller venues on the main street of Niagara-on-the-Lake, Ontario that require no amplification at all. With the staging of *Gypsy* in the 856-seat Festival Theatre in 2005, however, things changed. The venue received a wholesale performance sound retrofit that year, and performers used microphones for the first time, due to the necessity to balance their voices with the orchestra, reproduced electronically from cramped quarters in the pit directly

beneath the stage.

Because the pit is so small, it has been difficult to amplify the quieter instruments—the harp and strings, especially—without simultaneously boosting the level of the louder instruments, such as drums and brass that bleed into their microphones. This is by no means unique to the Shaw Festival, but the location of the pit in relation to the stage and the almost total lack of separation between musicians exacerbate the problem.

For *My Fair Lady*, sound designer John Lott came up with a novel way to help isolate the microphones on the harp and strings using semi-cylindrical baffles made from an innovative material, aluminum foam.

## Aluminum foam to the rescue

According to the manufacturer Foamtech, aluminum foam "is formed in a sponge shape after melting aluminum ingots with various ingredients, and has pore cell inner structure. These porous materials are much lighter than original metal materials, have improved energy absorption, as well as excellent sound absorbability."

Lott put it more simply. "It's made from shredded recycled [soda] cans, melted down and injected with a foaming agent to shape to the appropriate density. It's stiff, lightweight, and fireproof, since aluminum melts at 660°C. There's no toxic off-gassing, because there is only air in the cells. To top it off, it has a terrific sound transmission coefficient."

Lott discovered aluminum foam in his capacity as importer of custom yachts from Asia into North America. "We use it in large yachts where you've got two big 2,000-horsepower

Caterpillar engines banging away right underneath your feet. If you line the engine room with wallboards consisting of two 9mm layers of aluminum foam sandwiching a single 18mm-thick piece of polyurethane foam, you can cut the noise by 60dB," he said, acknowledging that the microphone screen is still in the prototype stage and testing has not been completed.

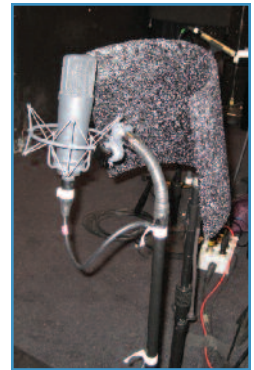
(A consulting acoustician who declined to speak on the record for this article disputed the 60dB figure in principle, explaining that only the mass of something like 12" concrete blocks can provide that kind of isolation, and aluminum's very low density works against it in this regard.)

While not yet widely used as a building material in North America, aluminum foam has been used extensively in Asia, most notably in construction of the Bird's Nest Stadium in Beijing, and is valued for its strength and acoustic properties, Lott said. While the Korean manufacturer Foamtech

has patented aluminum foam, he explained that he holds the rights to the use of the product in North America through another company.

"It's just a crazy-looking product that we have been messing about with. It's 100% recycled, and the units at Shaw are coated with one part black epoxy, so they look really slick. But, as a product, the microphone screen is in its infancy," Lott said, adding that the product is currently going under the name Acoustic Sound Suppressor.

His microphone screen is similar in shape and dimension to a number of other ambient noise-reduction microphone screens currently on the market—it is not yet available for purchase—but it is very light, weighing less than the small gooseneck used to mount it to a stand, and is virtually



A microphone shielded by an aluminum foam baffle.

Photo: Catherine Bacque

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The screen is fixed to a slim 12" gooseneck with three small fasteners.

indestructible. (My first impression was that it's like a metallic version of the foam shrimp chips served in Asian restaurants, with the texture of a Rice Krispies square.)

A cylindrical section, measuring 9" high x 16" wide with a 6" radius, the screen is fixed to a slim 12" gooseneck with three small fasteners. The gooseneck terminates in a clamp with thumbscrew for mounting onto a microphone stand like a pop filter, although Lott has made a few units that terminate in a standard

5/8" 27-thread.

Lott explained, "The shield cups around the rear of the microphone and all the off-axis crap being generated by every other instrument in the bit gets absorbed by the shield. This gives the mic a truer reference of what's actually coming at it, as opposed to all the off-axis hash that's coming from everywhere else in the pit. It works as both a barrier and an absorber.

"Prior to this, whenever we turned up the cello, all we heard in the sound system was the brass. Now we have control over every instrument," he said.

"It's fantastic," said head of audio Walter Lawrence, now in his 29th year at the Shaw Festival. "This is the first time we've been able to isolate the instruments in this incredibly noisy environment. It's amazing what the screen does for the strings—simply stunning."

The harp in particular has benefited the most. "The harp and the double bass are side by side in the pit. Of course you want all the subtleties of the

harp, but you usually can't get that with the double bass booming away right next door," Lott explained, adding that positioning the screen around the harp mic, with the rear of the screen pointing toward the bass, solves the problem.

"Hands down, there's no comparison. People who heard the difference while we were experimenting with position during tech have tried to put in orders for the screen, but we're in such an early stage of development that we're still making them one at a time," he said.

### The performance sound system

In addition to the harp, two violins, viola, cello, and acoustic bass, the orchestra is comprised of three brass and three woodwinds (doubling on various instruments), two keyboards, and drums/percussion. Instrument microphones include Neumann KM 184s on strings, TLM 193 on double bass, TLM 103s for drum overheads,

Photo: Catherine Bacque

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Mixing duties are handled by a Level Control Systems LCS Matrix3 audio mixing system, with CueConsole modular control surfaces, configured with 128 inputs and 62 outputs. Control surfaces are located in the front-of-house position at the rear of the orchestra level, in the backstage area for mixing monitors for the actors and orchestra, and up in the sound booth at the rear of the balcony.

The control surfaces handle six LCS Matrix3 LX300 audio engines, which include all the DSP, equalization, and delays for the loudspeaker systems.

An LCS Wild Tracks sub-system is used to replay sound effects from an integrated hard disk recording system.

Lawrence mixes the show using 130 snapshots, configured and tweaked during tech rehearsals.

Two Meyer CQ-1 and one UPJ-1P self-powered loudspeaker systems are mounted on each side of the proscenium, along with two Meyer UPA-1P self-powered loudspeaker systems in the center cluster. These are supplemented by two Meyer 650P self-powered subwoofers in the proscenium arch, and two more 650 subs in the ceiling that are powered by QSC amplifiers. Seven additional Meyer UPJ-1P self-powered systems provide front in-fill, front down-fill, and under-balcony coverage, and 22 Meyer MM-4 miniature wide-range loudspeakers are distributed around the hall to provide complete coverage at every seat. System delay, equalization, and unity level are analyzed and controlled by a Meyer SIM-III system, using eight

Earthworks M30 microphones.

Sound effects are replayed through four Meyer UPA-1P systems, one at each corner of the stage, and one Meyer UPA-1C for upstage effects playback. Six Meyer UPM-1 stage monitors provide monitoring for the cast and crew. All passive loudspeakers in the stage area are driven by QSC amplifiers.

From my seat in the 14th row during a sold-out matinee early in May, I could hear every word spoken and sung from the stage. The instruments were all clearly defined and well localized, and the harp sparkled with an almost bell-like quality. The sound pressure level rarely exceeded 90dB, ample proof that the role of a performance sound system in capable hands is to increase intelligibility, and not necessarily volume—and to help happy audiences lose themselves in the theatre for a few uplifting hours that they won't soon forget. 🎧

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