

Getting Gymnasium Acoustics Right

By Ron Bull and Jason Lavoie

Upgrading or specifying an audio system in a gymnasium can be a daunting proposition. Unfortunately, in the design phase of recreational facilities, the acoustics of a building are often neglected by architects in favor of all the visual aspects.

What's Your RT Factor?

RT (Reverberation Time) is a simple measure of the echo characteristics of your building. In many poorly designed gymnasiums, it is as high as 10 seconds or more. With an RT like this, you can easily spend a small fortune on upgraded audio and only see a 5% improvement in sound. The ideal range for RT in a recreational facility is between 1 and 3 seconds. If it is less than this, then your facility begins to feel like a library. It will lack the feeling you want from an excited crowd when the home team scores.

But, the downside of high RT is much more serious. No one can hear the announcements properly. The coaches can't make themselves heard to instruct their players. Everyone is shouting at everyone, and the net effect is higher stress levels and shorter fuses. Studies have actually shown that vandalism increases in gymnasiums with overly high RT.

How Do You Check the RT?

Most installers who are well-experienced in gymnasiums or other recreational facility installations can measure the RT for you. Or, if you want to call someone who isn't going to try to sell you their solution, your local professional sound company will very likely be able to measure it for you. We're talking here about the sound company that provides the PA for concerts in your area.

What to Do

Fortunately, reducing a too-high RT Factor isn't rocket science. After all, we're not trying to create a new Carnegie Hall. Acoustically absorbent materials can be placed on ceilings and walls just like so many "blotters." The idea is to cut down on the percentage of acoustically reflective surfaces in the area.

In existing buildings, this can be done using 4'x8' panels of acoustic material placed on the ceiling and walls. If you are able to address this at the construction stage, it is advisable to specify steel decking with noise-reducing characteristics such as a deeply ribbed profile and perforations that help disperse sound waves rather than reflecting them back like a mirror. You'll need help from a reputable contractor with expertise in this area, but you don't really need to hire a team of PhDs and engineers to get the job done.

Once you've got the RT under control, the next question is...who are you going to call? The watchword here is experience. When shopping for an installer, you need to be sure that they have real in-depth experience with gymnasium installations that verifiably goes back at least 5 years and preferably 10 or more. Installing sound systems in convention centers, restaurants, dance clubs, shopping malls, etc. does not necessarily prepare you for the conditions that are part of a gymnasium install. Hanging a heavy speaker that is

not designed to be hung is inviting disaster. Improvised or improper hardware mounts are pretty dangerous for anyone underneath.

Speakers are often used for target practice, and this can do serious damage to a conventional speaker designed for less hostile environments. So, your installer has to know which products are tough enough for the job. Choosing an installer who can demonstrate that his installations sound great and last for years is probably the most important part of the whole process.

Important Features

When designing a multi-zone sound system for a gymnasium facility, there are some special considerations to keep in mind.

Look for specialized speakers. Make sure that your installer is specifying speakers that are rugged and are designed to project sound efficiently and with a high degree of intelligibility. This is the opposite of the speakers used for hi-fi, which tend to be relatively inefficient (less volume per watt of input signal) and are optimized for music.

Centralize the control. Plan for a separate room that will contain the main control elements of your system. In this room will be your signal processing equipment, main power amps, graphic equalizers, etc. Once your installer has tuned these elements for optimum sound in the various areas of the building, you want to be able to keep the electronics locked up and out of reach of the curious. A little knowledge is a dangerous thing here. Your control room should include monitor speakers and a zone switching system. Monitoring the zones within the system will enable the operator to know what is going on in all zones. Interrupting a young gymnast's test routine with a booming voice saying, "Joe, please pick up line 101" will not go over well.

Keeping it simple is very important when it comes to the interface with the end users. There are mixers that feature effective function linked with the simplest possible interface. Users simply plug in a mic or music source and adjust the volume. Critical adjustments such as volume limits are internal and cannot be tampered with by the end user. These units are just the kind of thing for gyms, as they are built to withstand years of hard use and are even available in a lockable case for added security.

Recently, the price of mixers with many channels and a bewildering array of features has come down so dramatically that it's tempting to choose this type of equipment over simpler alternatives. The downside is that it's a rare individual who really understands how to properly set up a complex multi-channel mixer.

Getting the audio right in large recreational facilities is a very complex task. Covering everything in one short article just isn't possible, but we hope we've been able to provide you with some key points to get you off on the right foot.

Remember, cheaper isn't always better. Pay careful attention to the acoustics of the building first and be sure you are dealing with installers who have real in-depth experience in recreational facility audio.

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