not practical when building a point-source array because of the need to gap the columns apart from one another in order to allow splay angles between columns. Additionally, it is very difficult to maintain a coherent zenith alignment in the vertical plane as the loudspeakers are tilted down. It is possible, however, to retain some vertical alignment for two to three rows of loudspeakers without introducing a tremendous tensional load on the loudspeakers and suspension system.

Point-source arrays (see Figure 4) are a combination of the horizontal and vertical configuration, while incorporating trade-offs from both approaches. When designed with a clear understanding of where the system needs to acoustically perform best, the point-source array can be impressive. These arrays are usually custom built for a specific installation and can be quickly assembled, depending upon the design. Because they are custom designed, the splay, tilt, rotation and zenith can all be appropriately planned.

Line arrays (see Figure 5) are a refined form of a vertically configured array. The line array maintains close tolerance in the vertical plane to take advantage of close-coupling effects to steer array dispersion and increase acoustic output. Line arrays are not usually used in multiple columns and therefore do not realize the effects of horizontal acoustical conflicts.

Rigging hardware

Regardless of the type of loudspeaker array, the system will be only as strong as its weakest link. The importance of safety and conservative design methods cannot be stressed enough when considering the weight of the average loudspeaker array and the overhead suspension placement in most applications. There is simply no room for error or guesswork. The weak link in an array may be the wire rope sling suspending the grid or perhaps the shackle or turnbuckle connecting to an eyebolt. It can also be the loudspeaker enclosure itself or the fitting used to attach to the loudspeaker hardware. The loudspeaker array must be designed to maintain appropriate design factors throughout the rigging system.

Attachment to the structure can be one of the more complicated aspects of rigging loudspeaker arrays because of the variety of installation methods and the multitude of structure construction types. A professional engineer can help a great deal in determining the best method of attachment to the structure. Additionally, a professional engineer can decide if the building is strong enough to support the concentrated load that most loudspeaker arrays will generate on the structure. In some states and/or municipalities, there are structural guidelines that must be followed when rigging a loudspeaker array, and a professional engineer can help with these issues as well as afford liability protection.

Final thoughts

Loudspeaker arrays are constructed in countless variations of styles and approaches, but they all have one thing in common—they are heavy objects suspended above the heads of the public. The priority of the loudspeaker array designer and installer must be placed on the safety of the suspension system and the proper installation of the array. Acoustic characteristics can be accounted for, and proper placement of the loudspeakers can be worked into the array to produce a very coherent loudspeaker cluster without compromising system safety. It is the responsibility of each industry professional to hold himself personally accountable for safe loudspeaker arrays. S&VC

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