



Tilt Angle Balancing Act

Polar Focus Designs Two Tiered Cluster For Chicago Auditorium

Advanced Audio and Lighting of Peoria, Illinois was awarded the job of installing a new sound reinforcement Auditorium at the Moody Bible Institute in Chicago. The system would need to handle spoken word, live music and recorded music. After MBI was presented with several ways to go, the choice was made to use four speakers from the Synergy Horn line manufactured by Danley Soundlabs. All four would be rigged in a center cluster, with one pair over the other.

The models chosen were two SH25, and two SH50 loudspeakers, all in white. The SH50's, at 142 pounds each, and the SH25's, at 176 pounds each, made for a fairly heavy cluster at a total speaker weight of 636 pounds. The crew at Advanced Audio and Lighting had worked many times before with Polar Focus Audio Rigging, and called on that company to provide the design and hardware for hanging this cluster.

Danley Soundlabs makes hardware kits for attaching their speakers to each other, and that's what Advanced used to join the SH series speakers together in side by side pairs. The tight packed arrays of two took care of the side to side, or pan, angling, and meant that only the tilt angle had to be addressed through the Polar Focus rigging design.

The engineers at Polar Focus needed to devise a way to tilt the two pairs of speakers independently of each other while all hanging from the same two rigging points in the ceiling. The SH50's have a familiar trapezoid shape, but the shape of the SH25's is a less common extra deep double trapezoid. A particular challenge was to support the lower row of SH50's that was mostly blocked from above by the SH25 extra deep enclosures. The SH25's, on the upper level of the cluster, needed to tilt at an angle of -3 degrees. The SH50's, beneath the SH25's, needed to tilt at an angle of -40 degrees.

To achieve this configuration, Polar Focus needed to know the center of gravity, or COG, of the speakers. The core of any Polar Focus rigging design is balance. Instead of forcing the speakers into the desired angles with lots of cables pulling and holding them in a certain position, Polar Focus uses the COG, the shape of the speaker, and the available rigging points on it to calculate a design which works with, not against, the way a speaker would naturally “want” to hang. The end result is somewhat like a mobile, with suspended objects positioned in balanced relation to each other.

As stated before, the SH25 boxes presented an interesting problem, in that they are very deep and at first they seemed to block the way to hanging the SH50’s under them. This problem was solved by putting a spreader beam at the top, longer than the cluster is wide, and another spreader beam under the SH25’s. The upper pair of speakers, and the lower spreader, were suspended from the upper spreader. The front points of the SH50’s were attached to the lower spreader, and the back points, with the help of an eyebolt angle kit, were attached to the upper spreader using fixed length wire rope cables. As the total weight of the speakers was 636 pounds, and the hardware weighed less than 100 pounds, the whole assembled cluster could be hung from a ZB-20-880-W half.

Time was fairly short from initiation of this design to completion of the installation. Although Polar Focus keeps white powdercoated standard components on the shelf, time constraints prevented the custom spreaders from being powdercoated, and they were painted white by Advanced Audio after delivery. The wire rope assemblies and fasteners were all natural color. Hanging two pairs of arrayed speakers from one pair of ceiling rigging points such that the pairs have tilt angles independent of each other is a matter of knowing their centers of gravity. Moody Bible Institute’s Torrey-Gray Auditorium now has high quality sound reinforcement from a tight packed, independently angled speaker cluster where precise audio rigging complements high directivity speaker design.

www.polarfocus.com

www.advaudio.com

www.moody.edu/

www.danleysoundlabs.com