

New Binder

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"During the past year, over 45 acoustic consultants visited RPG for our day-long Diffuse Seminars. They are always amazed to learn about the breadth of what RPG offers and anxious to see how their colleagues are using RPG's acoustic systems."

For up to the minute information, we invite you to visit RPG's acclaimed web site: <http://www.rpginc.com>.

DIFFUSE NEWS



Dr. Peter D'Antonio
President and CEO

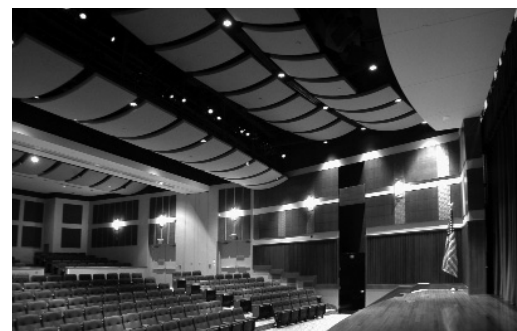
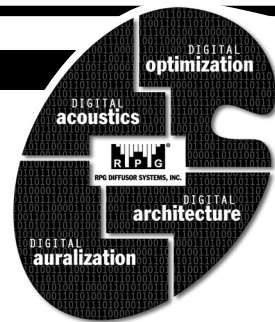
Everything Acoustic!

RPG's core belief is that a commitment to fundamental acoustics research will allow RPG to develop innovative products, which continually redefine the state-of-the-art and make a difference. Today, our mission is to provide AcousticTools® through our own development or through representation of other exciting new technology to continually expand

the acoustical palette and offer specifiers Everything Acoustic! As we expand this palette, there has been a growing need to document the myriad of products forming the Next Generation of Architectural Acoustics, which we call NexGen™, in a binder that both architects and acousticians can refer to for information. However, for the latest breaking developments, please stay tuned to www.rpginc.com. *This is only the beginning*.....

Continually Evolving

Over the past 20 years, RPG has grown in many ways and expanded as a resource for acoustic consultants. While RPG still provides solutions for the most prestigious recording, broadcast and performance facilities in the world, we are also very pleased that our solutions are now more frequently used in everyday neighborhood schools and worship facilities. This is due in part to RPG broadening its product line to include the most extensive variety of sound absorbing and sound diffusing products. The successful use of RPG's products in a growing number of schools and worship facilities across the country is also due in large part to the acoustic consulting community learning about RPG's new breadth and using RPG's acoustic treatments cost-effectively in appropriate locations. Whether it is the ceiling of a band room, rear wall of an auditorium, upper walls of a gymnasium or suspended surfaces over a contemporary worship space, RPG has a solution. Whether the acoustic requirement is absorption, diffusion or reflection, RPG has a solution. Whether the architect desires the look of wood, masonry, glass or fabric, RPG has a solution. Whether the budget is luxurious or 'bare-bones', RPG has a solution. The first step for any consultant who is less familiar with RPG is to take advantage of RPG's educational opportunities in-house or in your office. During the past year, over 45 acoustic consul-



Holy Cross, Kensington, MD. Acoustical consultant Luis-Eduardo Soares, Electro-Media Design, Rockville, MD

tants visited RPG for our day-long Diffuse Seminars. They are always amazed to learn about the breadth of what RPG offers and anxious to see how their colleagues are using RPG's acoustic systems.



Clark Pleasant High School, Whiteland, IN. Acoustical Consultant Tom Lorenzen, dBA Acoustics, Ft. Wayne, IN

OVERHEAD CANOPY DESIGN AND OPTIMIZATION

The purpose of an overhead reflector is to blend direct and reflected sound to either enhance intelligibility or musical clarity. Typically ceilings in speech rooms are kept low to provide early supporting reflections. In music rooms, clouds/reflectors can be used to increase clarity while not compromising the reverberance. Basically, canopies fall into two categories, which are determined by the amount of open area in the canopy. Sometimes canopies completely cover the stage (virtually no open area). These are common where the canopy is being used to block sound from entering the fly tower. Other canopies over the stage and audience use elements sparsely, with plenty of open area between the canopy diffusers or reflectors. **Solid ceilings** provide complete specular coverage, i.e. there is a specular reflection point from all sources to all observers. However, the strong directional reflections may cause the specular effects of comb filtering and image shifting, because the specular reflections contain the same frequency content as the direct sound and are displaced in time. **Canopy arrays** have the potential of not providing complete coverage due to the gaps between elements. This can result in loud and soft areas, if the shape and orientation of the panels are not optimized. In the past, poor choice of canopy shape, size and array patterns were the primary cause of uneven coverage in performance spaces.

Canopy design traditionally relied on trial and error, repetition of successful previous designs and geometrical ray tracing. Tremendous progress has been made in canopy design and optimization due to two significant milestones: Shape Optimization, which combines boundary element and multidimensional optimization techniques to provide optimal shapes and Aperiodic Modulation techniques, which remove periodicity effects by using "aperiodic" tiling of these optimized shapes.

1. Evaluate existing or preselected shapes
2. Use globally optimized shapes
3. Use one-off custom designed shapes

Evaluate Existing Shapes

Using BEM, we can assist acousticians by evaluating and choosing between a selection of shapes. Figure 1 shows that the optimized shape offers the lowest standard deviation in SPL, which represents the most uniform coverage, compared to a plane surface, 5' and 10' radius arcs and an elbow.

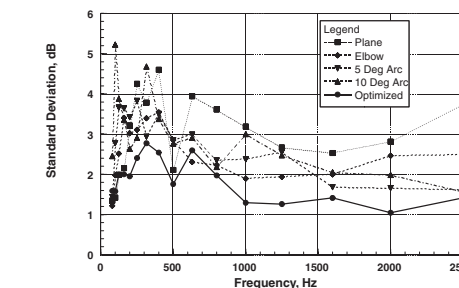


Figure 1. Standard deviation indicating uniform coverage for various canopy shapes.

Use Globally Optimized Canopy Shapes

The next approach is to use a palette of globally optimized shapes, which seamlessly tile "aperiodically" providing the most uniform coverage. Shown in Figure 2, the Monoradial and Spline scatter in one direction, the Biradial in two and the Bicubics omnidirectionally. The Monoradial and Biradial are offered only to satisfy an aesthetic requirement and offer lower performance than the optimized shapes. All are offered in non-combustible fiber-reinforced gypsum in various surface weights. A Spline application is shown in Figure 3.

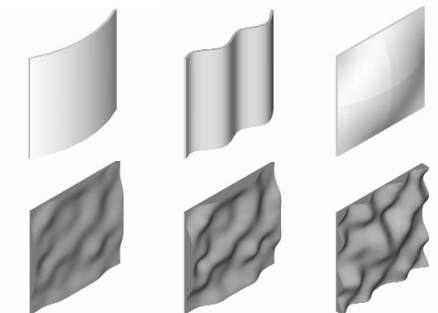


Figure 2 Top left to right: Monoradial, Spline and Biradial. Bottom left to right: 2" deep Bicubic, 4" deep Bicubic and 8" deep Bicubic.

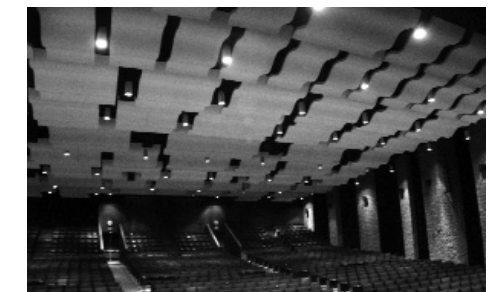


Figure 3. Starpoint High School, Buffalo, NY

Use Globally Optimized Canopy Shapes

Using our canopy design tools we can now optimize the shape, the tilt, the position and the array density. Therefore, we can design one-off custom canopies and acoustical towers. We have collaborated with many acoustical consultants on innovative canopies, an example of which is shown in Figure 4. Now you don't have to settle for bent plywood or drywall, you can provide your clients with the state of the art in canopy design.



Figure 4. Legacy Hall, Rivercenter, Columbus, GA