

TECHNICAL BRIEF:

Sound Construction

A/E/C WORLD MEETS ACOUSTICS METHODOLOGY

It's easy to sit in the middle of a concert hall and recognize the artistry of a musician's voice or playing ability. What is less obvious inside that room are all the acoustical features that strengthen the purity and brilliance of what is being experienced. To create a world-class performing arts center, the building must be designed and constructed to accomplish two very distinct things — maximize acoustic performance and isolate sound to eliminate unwanted reverberation.

For the University of Nebraska at Omaha, the renovation and expansion of the Strauss Performing Arts Center on its campus held these two criteria paramount to its goals for every room throughout the facility. Executed properly, the UNO School of Music would rise into the upper echelon of university programs in the Midwest.

CONSTRUCTION APPROACH

During preconstruction, The Weitz Company met with essential personnel from the UNO School of Music, project architect HDR and acoustical consultant Threshold Acoustics. These upfront meetings were invaluable in developing a collective understanding of the best practices to construct the spaces to achieve the highest degree of acoustical performance. The meetings also guaranteed the finished building would meet the UNO School of Music's growing needs — music technology has been the fastest growing program in the school — and would meet or exceed all accreditation standards the National Association of Schools of Music establishes for performance centers.

During preconstruction, Weitz and Threshold Acoustics also held a constructability meeting with all subcontractors prior to any work starting. The meeting's purpose was very pointed — showcase examples of best practices as it related to acoustic details to prevent errors in the field.

Once construction commenced, the project was divided into multiple phases to minimize the impact to students and staff. During some of the earlier phases, the Weitz project team used its Quality Management System to institute



a series of key quality inspections. These inspections ranged from constructability reviews to mock-ups to pre-dry-wall first work inspections. Weitz involved the architect and acoustician in the inspections to help set the bar for the specific acoustic details being targeted. These inspections served as litmus tests for our project team and Threshold Acoustics to ensure we got the acoustical details right before covering systems and moving forward. Quality control inspections were conducted on all major steps (i.e. framing, drywall, ductwork, flooring, etc.) before approval was given to commence work on larger spaces.

ACOUSTIC PERFORMANCE

The early collaboration meetings with the UNO School of Music and Threshold Acoustics helped identify key acoustic focuses for the music program. The goal was to improve performance in practice rooms, classrooms, offices and performance spaces. Collaboration meetings were held throughout the Design Development and Schematic Development phases. Care was taken to identify specific acoustical elements that were both aesthetically pleasing while improving the sound quality of a space.

Acoustic performance touched every aspect of construction. Even something as simple as framing the four walls of a room was tailored to maximize the acoustic impact. In particular, acoustically sensitive rooms were built with no right angles at any corners of the room.

To maximize the acoustic impact, the project incorporated the following elements:

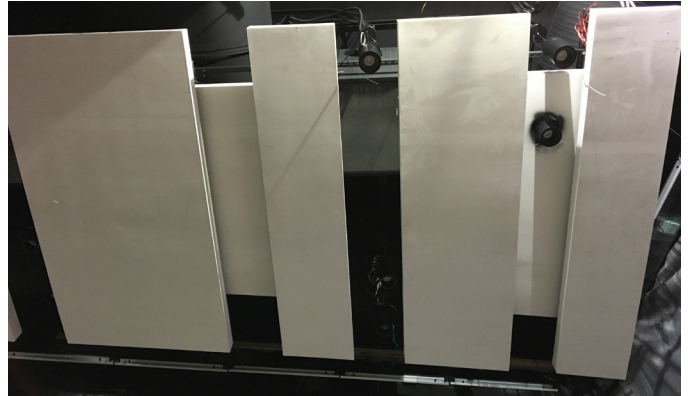
- + Diffusive wall panels
- + Acoustic banners
- + Fixed & adjustable reflective ceiling clouds
- + Absorptive acoustic ceiling spray
- + Acoustic doors
- + Sound absorptive & reflective acoustic ceiling panels

In many cases, the acoustic elements were inherently adjustable to allow set points to be created for different types of performances (orchestra, choir, band, soloist). Training was conducted to familiarize the UNO School of Music staff with acoustic systems.

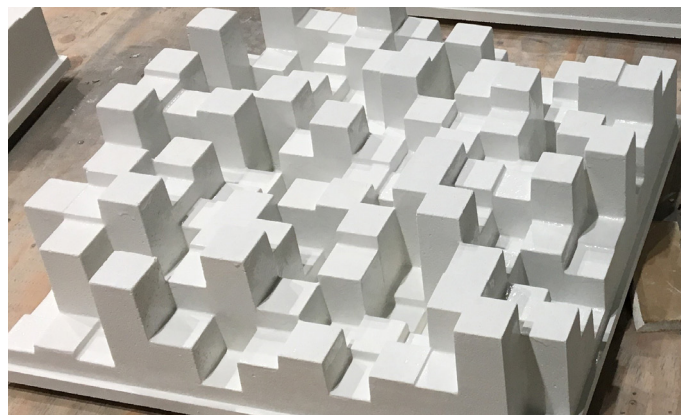
SOUND ISOLATION

Sound isolation for new acoustically sensitive spaces was another key design element of this project. The project team also took care to incorporate this into existing spaces being renovated.

To maximize isolation of sound, isolation springs for ceiling and ductwork systems, as well as isolation pads and springs for any mechanical and electrical equipment that created vibration, were utilized. Ductwork had lagging and attenuators to reduce noise from air moving through the duct while flooring was isolated by systems that, in some cases, used multiple layers of concrete and insulation. Other isolation elements included pads for wall framing (prevented framing from being rigidly attached to the structure) and MEP systems that passed through acoustically treated walls.



Acoustic Ceiling Panels



Diffusive Wall Panels



INTEGRATING BIM

Considering nearly every material or piece of equipment inside the Strauss Performing Arts Center could have an impact on the facility's acoustical performance or isolation, Building Information Modeling proved critical during design and construction.

Acoustic enhancing systems generally require more room, so coordinating those spacial requirements was essential to the build. As an example, much of the ductwork needed more space as it was wrapped with duct lagging. Acoustic isolation hangers for the duct could not (under any circumstances) touch anything else but the systems they supported. In conjunction with HDR, Weitz maintained the model in Revit, which clearly identified the building systems and their specialized acoustic components.

More often than not, these acoustic components had long lead times. We worked with the subcontractors to ensure the model was accurate so they had the confidence to order materials off it. This allowed the procurement of materials in a timely manner to meet project deadlines.

CONCLUSION

Working collaboratively with the client, architect and acoustical consultant, The Weitz Company helped the University of Nebraska at Omaha Strauss Performing Arts Center achieve the acoustical standards necessary to be viewed a premier facility in the Midwest. Faculty, staff and students will thrive in the upgraded facilities while performers and their audiences will be overwhelmed by the brilliant sound both the concert and recital halls can deliver.

ABOUT THE WEITZ COMPANY

As the sixth oldest A/E/C firm in the United States, The Weitz Company has forged its reputation on constantly seeking new construction innovations and technologies that provide clients with predictable, reliable and collaborative services. From first interaction with clients through project closeout, Weitz focuses on delivering value and eliminating waste during the construction process. It's a discipline that encompasses all of today's fundamental build qualities, and Weitz team members work diligently to align and elevate these practices to meet the specific needs (and wants) of every client. The end result is a project experience that is impossible to duplicate.

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