

Senyai: Vaulted Acoustics

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The ceiling of Senyai, inspired by the vaulted geometry of ancient Thai architecture, incorporates acoustic and lighting performance into a contemporary spatial experience with soft ambient effects. Visual layering of ceilings fins is suggestive of movement while changing the diffusion of global sound through varied depth of each individual double-curved vaulted zone. The global texture of the surface and color plays with light to create a sense of spatial weightlessness and visual expansion, as the eye travels beyond each articulated edge. At the same time the slats appear as a continuous surface, mimicking an active body of water, or, in homage to the restaurant's name ("senyai" translates to "big noodles" in Thai), a bowl of hot noodles in broth. The ceiling is formed by a series of 275 unique vertical slats that perpendicularly sectionally change in series in the perpendicular direction--no two slats, or vaults, are alike. Using a non-uniform diagrid as a method for standardizing highly varied component-based construction, we created a localized effect of privacy while diffusing sound through the dynamic character of geometry.

Using three dimensional ellipsoidal vaults, the ceiling geometry supports a sense of individual presence within the small collective space. An ellipsoid is a double curved surface that in its idealized version concentrates the direction of the sound to travel back to the foci point at which the table is located. In Senyai's ceiling the computational surface of the pure ellipsoid is materialized through series of diagonally cut slotted fins that mitigate sound reflections in the space related to high frequency sounds. The fins increase the area of the elliptical surface to maximize the number of sound reflections, trapping them sectionally within their depth and thus holistically performing as a spatial diffuser. As each bay within the diagrid has a varied size and depth, each bay produces a different frequency of reverberation, making the global diffusion more pleasant, cutting off high frequencies (high noise levels) in the space. The intention was to create a geometry that would both act as a holistic sound diffuser throughout the small room with the potential to direct the localized sound intensity towards

the elliptical foci, and cut off the fall-off sound towards the neighboring zones. Hence the depth of the fins varies, thinning towards the top vertex of the ellipsoid and thickening towards its edges. The scalar variation along the collective ellipsoidal geometry produces a series of sound effects dispersed along the larger space. Historically, double curved vaults were used to create echoed reverberation effects with a series of successive reflections on hard smooth surfaces. In this case, we are using geometry to simultaneously reflect and diffuse the sound to effectively soften the acoustic spatial quality. Slotting of the geometry eliminates the echo effects that would be otherwise produced, while still allowing for a concentrated privacy of sound within the loose boundaries of three dimensional bubble. The relationship of the global geometry to variation of the surface subdivision allows for both: easy digital fabrication through the use of CNC technology, as well as tighter coordination of performative effects.

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