YAMAHA
Make Waves

STORIES
Behind the Gear

Acoustic Design

The Evolving Sound of Yamaha Guitars part2

This article explores how Yamaha developed the sound of the FG9. Aiming to balance clarity and projection - key qualities for singer-songwriters - Yamaha worked closely with artists before conducting acoustic tests in an anechoic chamber. The prototype was then repeatedly refined to shape its ideal tone.

Acoustic Design of FG9

Interviewing Players to Determine the Ideal Tone

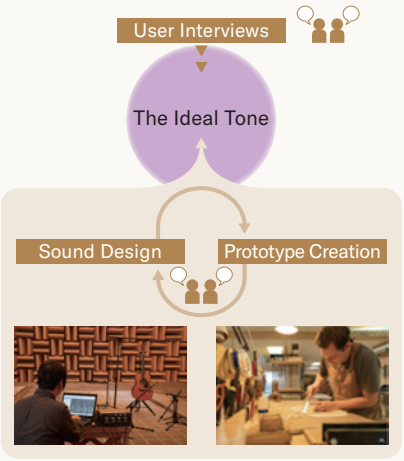
To begin developing the FG9, Yamaha started by listening to guitar players. **The team visited several major music cities and interviewed over 50 artists** who played Yamaha prototypes as well as guitars from other brands. We gathered honest feedback on sound and playability to truly understand what singer-songwriters value in a high-quality instrument.

Preparing for the 2-hour interview

Each interview lasted around two hours. Rather than focusing solely on music, the planning team engaged in broader conversations surrounding each artist's lifestyle to uncover what they truly needed from the guitar. A clear trend emerged from their feedback: **singer-songwriters look for clarity and projection** from their guitars.

- **Clarity**: A tone that is clear and articulate, even when played softly during quiet passages, blending naturally with vocals.
- **Projection**: A strong, forward sound that holds its own in choruses, allowing the performance to build dynamically alongside the voice.

Balancing these two qualities at a high level was essential for creating a guitar that singer-songwriters could truly rely on—and it became our goal in crafting the sound of the FG9.



Sound Design and Prototype Creation

By that time, Yamaha had already established solid techniques for achieving a clear sound. So, when developing the FG9, the focus shifted to **projection**, which became the central theme for its acoustic design.

Stories Behind the Body Design (1)

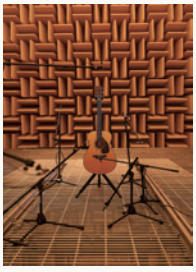
①Designing the Top Board

We began by carefully **analyzing the structure and frequency response of guitars known for their projection**. We used a full anechoic chamber to accurately measure the properties of the sound produced by the guitar, without influence from room size or reflections.

*A full anechoic chamber is a specialized testing environment where the walls, ceiling, and floor are completely covered with sound-absorbing materials to eliminate all sound reflections.

Various inputs, such as frequency-specific sounds, were applied to the guitar to observe how the wood moves during vibration, known as the vibration mode shape. For example, we identified the frequencies that contribute most to projection and mapped the areas on the top board that vibrated most prominently when those frequencies were applied.

To further enhance the vibration of those areas, **we intentionally designed the bracing and surrounding top plate to be thinner**. We refine our designs through repeated prototyping, testing, and simulations to achieve the desired acoustic characteristics.

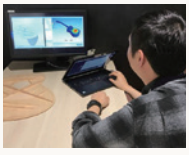


Inside a full anechoic chamber, various sound inputs are used to analyze how the guitar's wood responds and vibrates.

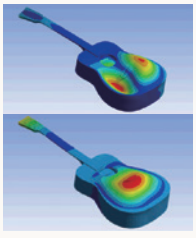
②Designing for Durability

Thinning the bracing enhances the wood's ability to vibrate, increasing the instrument's overall volume. However, if made too thin, it may lack strength against string tension, **so balancing vibration characteristics and structural integrity is essential**.

The heart of this approach is our wish for customers to enjoy their guitars for many years ahead. With that in mind, we carefully **simulate bracing thickness and placement using advanced computer modeling** and build prototypes, ensuring each guitar can be cherished and played as long as possible. Then we evaluate sound with users, and test durability, continuously refining designs to **achieve ideal structure and consistent acoustic performance over time**.



Simulation of the thickness and arrangement of bracing on a computer.



Simulation results being reviewed on a computer screen—red areas highlight where the wood vibrates most prominently.