

Acoustic Design

The Evolving Sound of Yamaha Guitars part1

A unique design approach called "Acoustic Design" plays a central role in how Yamaha creates the sound of its guitars. This method combines scientific analysis with the craftsmanship of skilled artisans to realize the ideal tone envisioned by guitarists. This article introduces the core technology behind the sound creation process at Yamaha, which is applied extensively across a wide range of guitars, from acoustic to electric.

Designing the Ideal Sound

Since 2014, Yamaha has implemented a unique design methodology called **Acoustic Design** for its guitars. Rather than relying solely on the experience and intuition of traditional craftsmanship, this approach also incorporates scientific analysis and engineering into the design process. The goal is clear: **to deliver stable acoustic performance and the ideal tone envisioned by the designers, with minimal variation between individual instruments—regardless of who plays them.**

Toward this goal, a project was launched around 2010 to fundamentally reexamine the performance of acoustic guitars. A team of engineers from the guitar development team and the R&D department conducted scientific analyses of how differences in materials, bracing, and structural design affect sound.

This design methodology has since been **applied not only to acoustic guitars but also to electric guitars.** By defining a clear sonic direction for each series, the engineers ensure that every model's intended sound character is faithfully reflected in its design.

Acoustic Design in Our Guitars

Acoustic Guitars

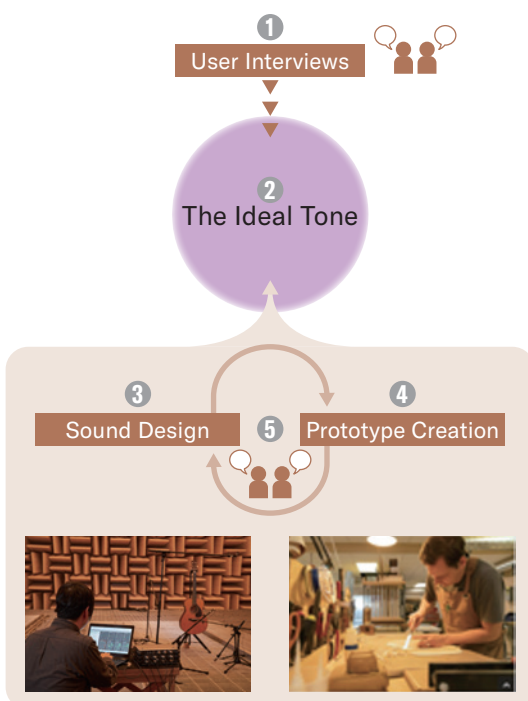
- FG/FS9 series
- FG/FS Red Label series
- FG/FS800 series
- L series
- A series
- CSF series
- NX series

Electric Guitars

- Pacifica Professional/Standard Plus Series
- REVSTAR series



What is Acoustic Design?



A method for achieving the ideal tone desired by players by scientifically analyzing the tonal characteristics and vibration properties of guitars, and incorporating those findings into the design.

- 1 First, **thorough analysis is conducted to understand what kind of sound players desire**, through interviews and other research methods.
- 2 The "ideal tone" revealed by this process serves as the foundation for design.
- 3 To achieve the ideal tone, **the sound design process** begins by examining how wood should vibrate and determining what kind of internal structure will best produce those vibrations. Using advanced vibration and acoustic analysis, along with tools such as 3D modeling, Yamaha approaches sound design from a scientific perspective. This process takes place at headquarters in Hamamatsu, Japan, equipped with acoustic measurement facilities and simulation environments.
- 4 Once the design is developed through the sound design process, **an experienced luthier creates the prototype**. During this phase, the luthier contributes ideas informed by their expertise, and the design evolves through close collaboration with the development team. The sound of the prototype is scientifically evaluated again, and feedback from players - including professional guitarists - is used to improve the design.
- 5 **This process continues until the guitar achieves its ideal resonance.**

This approach is applied to specific design elements such as the bracing patterns in acoustic guitars and the chamber construction in electric guitars, forming an essential pillar that supports the creation of the distinctive sound associated with Yamaha.