



The Bilbao project : How violin makers match backs and tops to produce particular sorts of violins

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Abstract

The Bilbao project aims at answering this question by relating intrinsic characteristics of the materials (wood density and stiffness) and some geometric characteristics of the violin's constituent parts (thicknesses of the plates) with the tonal qualities of the complete violins. To this end, six instruments were carefully built: three instruments with normal backs, each paired with a pliant (thin), normal, or resistant (thick) top ; similarly, three with normal tops, each paired with a pliant, normal, or resistant back. The two examples of normal top paired with normal back serve as a control. Wood for tops and backs were closely matched in density and sound speeds – all tops and backs from the same trees. Greater control was achieved by having all plates and scrolls cut by CNC routers. The outside surface was not changed during the experiment, as the graduation was performed entirely on the inside surface. In addition, structural measurements were taken at many steps during the building process and the instruments were then assessed during playing and listening tests. These six instruments constitute therefore an unprecedented set of carefully controlled and documented violins, and offer an incredible opportunity for conducting various analyses and correlations.

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