

Viola a chiavi di Siena

What we nowadays call the *Viola a chiavi di Siena* can be classified to the medieval fiddle. This underscores the fact that the medieval fiddle was one of the most popular instruments of the 15th century. Various body shapes, sizes, number of string, bridge positions, positions of playing the instrument can be identified in preserved sources. In the case of the *Viola a chiavi di Siena* the fresco by Taddeo di Bartolo reveals many details. In this period it was common to hollow out the body out of a wooden block. The top of the instrument was glued and/or fixed with some wooden nails.

Not many instruments have survived from this period, but those who did let us know what material was used. Spruce for the soundboard and willow, linden, fruit wood, maple etc. for the body.

The painting gives us many details about the size of the instrument, the vibrating string length, number of strings, number of keys and decorative elements.

On the neck is a box with keys covered by a lid. The strings are fixed on a tailpiece and running over a curved bridge to the pegbox under the lid. The positions of the C-shaped sound holes is in the lower part of the body. The shape is a really common one for the period and draws a conclusion that there exists same body models just with different neck variety. If we take a closer look at the construction we will come to the point where the question about the soundpost and the position of the bars pops up.

From the view as luthier there are several options to reinforce the soundboard against the string pressure. Three or two bars can be glued across to the string position. A bar can be glued in the middle or on the bass/ treble side following the direction of the strings. Additional in that combination are also small bars in different positions possible to influence the sound radiation. It

is quite possible, that instruments had a soundpost. As we know from an fresco by L. Signorelli in the Casa Santa, Loreto, Italy. The painting shows a soundpost through the sound holes of an fiddle (Winternitz 1967) before the restoration of the painting. An instrument with a soundpost has a different character. This includes the volume, frequency spectrum and the sound radiation. It also responds different for the player. Furthermore some sound adjustments are possible by changing the soundpost position afterwards.

The construction for the instruments in this project based on *the classical way of building* and is inspired by the fresco from Taddeo di Bartolo.

Measurements and proportions are adjusted as best as possible. The sides, back and neck are made out of maple. The top is spruce. The four row-keyboard is a more complex one as we can find on the painting. The instruments are played with gut strings.

The instrument which is played by Marco Ambrosini is made out of spruce (except the neck) dated back from 1480.

To understand the character of an instrument and what happens or not while playing it I did some measurements.

The following graphics show two soundboard admittance measurements right after finishing the instrument and after 2 years playing. It is clearly recognizable that some main characteristic peaks moved to the lower register while other didn't.

An increase of the amplitude of min. 2.5dB to max. 6.5dB on the y-axis. This is the result of 2 years of playing the instrument and emphasizes the importance of playing a new instrument.

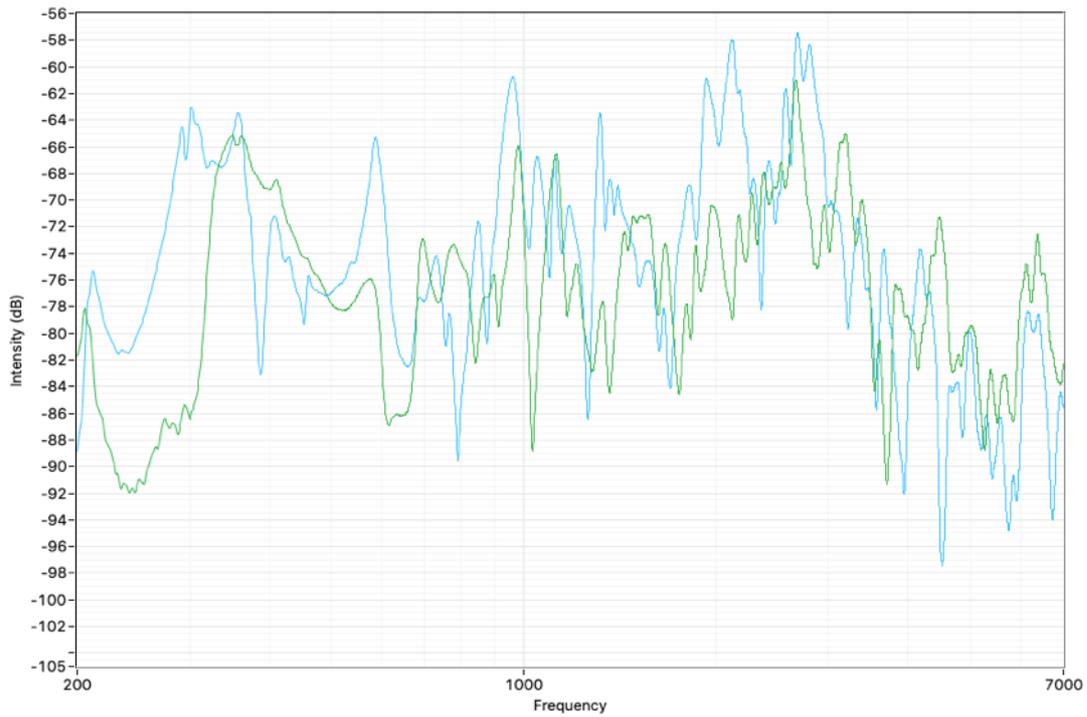


Figure 1 : Green describes the instrument right after finishing and the blue graph was measured after two years of playing.

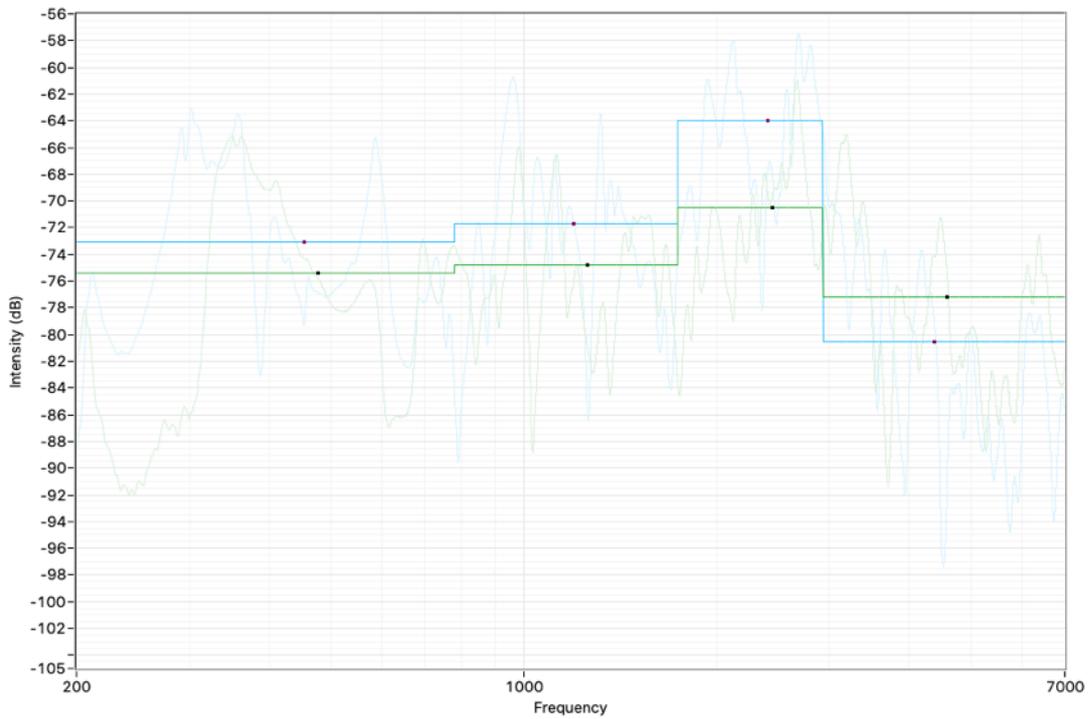


Figure 2 : Four frequency bands which are important to describe the character of an instrument (x-axis) show the difference (dB, y-axis) of the two frequencies curves.

The following graphs compare a Viola and a *Viola a chiavi di Siena* in a sound radiation measurement set-up. The frequency response curves representing the instruments and their different character.

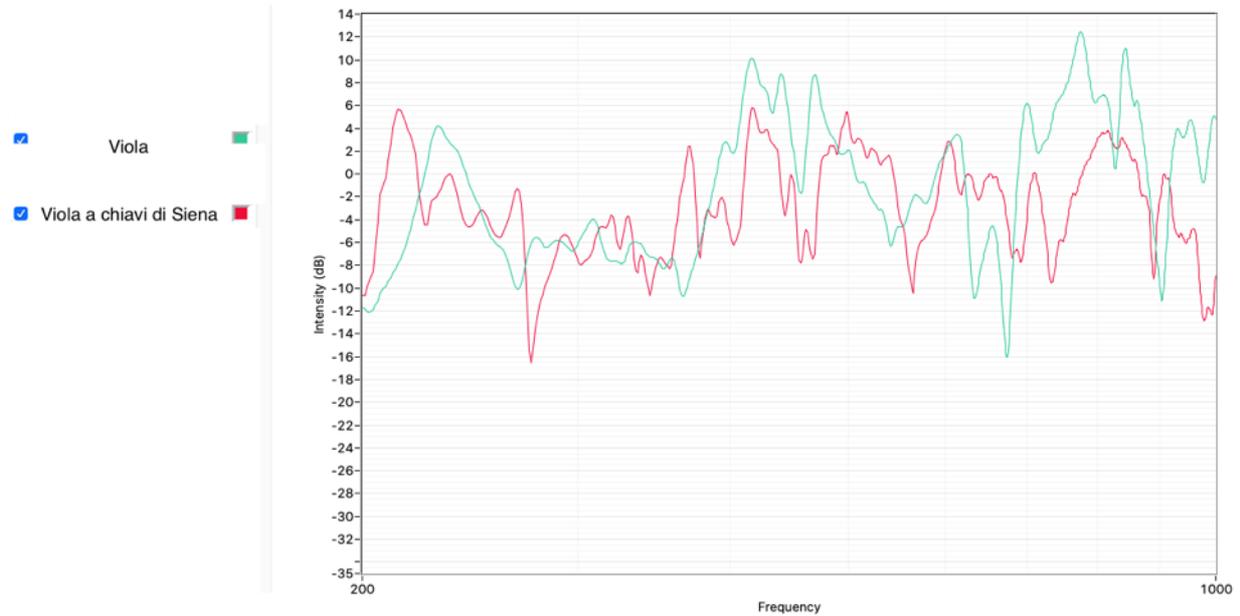


Figure 3 : The green frequency curve describes a Viola and the red the Viola a chiavi di Siena.

The lowest mode which is called the A0 mode is the Helmholtz air resonance. It's the air movement in the body including the air flow out of the sound holes.

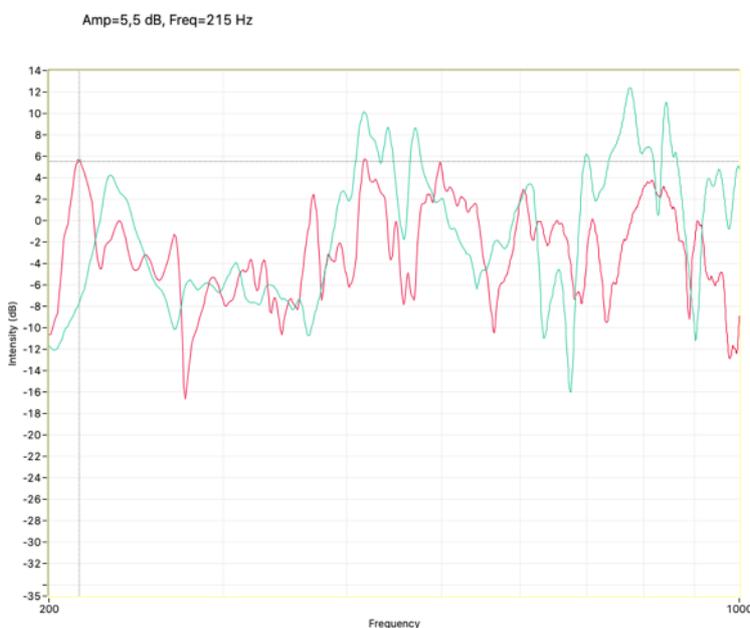


Figure 4: The Helmholtz air resonance on a Viola a chiavi di Siena is 215Hz.

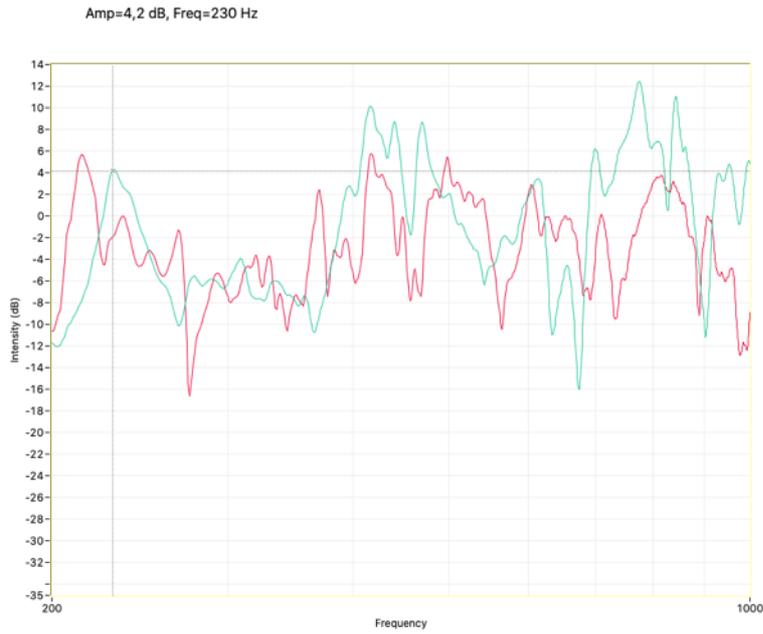


Figure 5: The Helmholtz air resonance A_0 on a 40.5cm long Viola is 230Hz.

The difference of the two A_0 modes is not significant and the rough character of the frequency curves show a similar tendency. Of course we have to pay attention to the different constructions etc. But it suggests that the *Viola a chiavi di Siena* has a similar sound volume like the Viola. Or the other way around?



About me: I am a professional violinmaker working and living in Leipzig, Germany. I was educated in classical violin making at the College of Applied Art Schneeberg | Department of Musical Instrument Making and Markneukirchen.

My work includes the classical instrument and Viola d'amore a chiavi making.



The modeling of my instruments is inspired by the great Italian masters as well as based on the results of researches about acoustical function of instruments. I gained important experience at violin making workshops in Sweden, Italy and Norway. I am also collaborate with the workshop of Klaus Ludwig Clement and I regularly participates at expert conferences and give lectures about violin varnish, acoustical researches.

