



Rubber Banjo Bridge Demo

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Wondering about what a rubber-topped bridge would do for your banjo? Read on and hear an example.

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Rubber bridges have appeared with increasing frequency among guitar players in the last couple years.[1] It comes from a desire to get a new sound, maybe something more primitive. One demo likens the rubber sound to palm muting but easier to do and includes a snippet of Mississippi John Hurt.

Some banjo players only want to sound like so-and-so. But others are eager to explore the possibilities. Many professionals that I've heard live in solo engagements have brought along several very different banjos to get some range of sounds — and keep the audience engaged.

The first one I slapped together (in the page 1 photo) weighs 5.7 gm — more than double what's commonly used for a banjo bridge. In general, increasing the weight of the bridge lowers the primary formant central frequency (a feature that dominates that voice of the banjo). It also increases the sustain. In the present example, it might be that the weight compensates for some of the rubber damping, and rubber+weight gives a sustain that seems more normal than what might happen with a rubber-topped bridge whose total mass were more typical.[2]

The sound comparison (below) is to the same banjo with a fairly standard bridge of 2.2 gm. Yes, it's laptop built-in mic recording in my kitchen, with all items balanced on my knee, and sound bouncing off the table. A real comparison deserves better. However, the comparison was done with the same recording level and same positioning of mic and in the room.

<http://www.its.caltech.edu/~politzer/rubber-bridge/rubber-bridge-demo-2.mp3>

<http://www.its.caltech.edu/~politzer/rubber-bridge/rubber-bridge-demo-3.mp3>

Unfortunately, I cannot specify the kind of rubber used for this particular bridge. It came from a scrap donated by the fellow who manages the physics lecture demonstrations, with unknown provenance. It is dense and flexible but cannot really be compressed by fingers alone — rather like car tire rubber. It came as a $\frac{1}{4}$ " thick sheet. From experience, I'm inclined to think that it is real rubber rather than a petrochemical concoction.

I. FURTHER DIRECTIONS

The behavior of rubber very quickly takes one far from elementary physics. But two lines of inquiry come to mind that might be of considerable interest to some people.

The first is related to the psychacoustics of timbre. The rubber bridge admittance could be measured — with attention to the imaginary part, as well. The question is how do the measurable aspects of the sound relate to the most salient distinctions that we hear.

The second is a practical matter for players. What happens to the sound over a practical range of weights?

[1] e.g., <https://reverb.com/news/the-rubber-bridge-guitars-taking-over-indie-music>

[2] a technical exposition is available, open-access, as *Acoustics of the Banjo: measurements and sound synthesis & theoretical and numerical modeling*, J. Woodhouse, D. Politzer, and H. Mansour, *Acta Acustica*, **5**, 15 and 16 (2021) <https://doi.org/10.1051/aacus/2021009> and <https://doi.org/10.1051/aacus/2021008>); *Pickers' Guide to Acoustics of the Banjo*, D. Politzer, J. Woodhouse, and H. Mansour, HDP: 21 – 01, <http://www.its.caltech.edu/~politzer> – APRIL 2021 is an informal account of some of the salient results.