REED CHAMBER RESONANCES IN FREE REED INSTRUMENTS: PROBLEMS AND POSSIBILITIES

James Cottingham
Coe College, United States
jcotting@coe.edu

ABSTRACT

This paper presents an overview of recent research on reed chamber resonances in free reed instruments. Western free reed instruments such as the accordion, harmonica, and harmonium do not normally employ pipe resonators to determine the pitch, but all do feature some sort of reed chamber or cavity in which the reed is mounted. This is necessary to provide a secure mounting for the reed and to properly direct the airstream. The reed chamber will necessarily have resonances which can affect the tone quality and may have some effect on the pitch. Since the cavity volumes are small, however, the resonances will have high frequencies, and the effects on the reed vibration generally tend to be small. An exception to this can occur in the accordion or harmonica for higher pitched reeds, for which a resonance of the reed chamber can be close to the vibration frequency of the reed tongue. In this case the cavity air vibration can become large enough to influence the self-excitation mechanism, possibly interfering with tongue vibration and the resulting musical tone, and in some case preventing the sounding of the reed at all. Builders typically attempt to alleviate this situation by modification of the reed chamber. In the harmonica, if the effect is not too great, skilled players, already accustomed to pitch bending, may be able to overcome this difficulty in some cases by appropriate changes in the vocal tract. In the case of the accordion, Tonon has recently described and implemented means of modifying the internal construction to include a player-controlled internal resonating chamber of variable frequency to enable pitch-bending by the player somewhat similar to that available to the harmonica player.