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Aeroelastic-aeroacoustic measurements in a self-oscillating physical model of the human vocal folds[1] MICHAEL KRANE, ARL Penn State, ZACHARY CATES, ARL Penn State/Virginia Tech — Measurements are presented characterizing the relationship between the structure of physical models of the human vocal folds and the sound produced by their vibration by airflow from the lungs. The model vocal folds are fabricated by molding two layers of silicone rubber of specified stiffness, approximating the body/cover structure. These are mounted in a model vocal tract, where the prephonatory gap adjusted using micropositioners. Measurements conducted in an anechoic chamber include radiated sound pressure, and high-speed video of the vibrating model vocal folds, using prephonatory separation, body stiffness, and subglottal pressure as input parameters.. Essential behavior of the vocal fold models is presented. Vibration fundamental frequency and radiated sound pressure level outside the model vocal tract as a function of subglottal pressure and prephonatory gap are presented for the cases of two identical vocal folds and one vocal fold with lower stiffness, approximating vocal fold paralysis.

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