

DESIGN OF VIBRATION-BASED MINIATURE GENERATOR USING PIEZOELECTRIC BENDER

Wei Li ¹, Tzong-Shi Liu ^{1,*}, Heng-I Lin ², and Yi-Jeng Tsai ³

¹ Department of Mechanical Engineering

National Chiao Tung University

Hsinchu 30010, Taiwan

² Liung Feng Industrial Co., Taipei, Taiwan

³ Mechanical and Systems Research Laboratories,
Industrial Technology Research Institute, Hsinchu 31040, Taiwan

E-mail: tsliu@mail.nctu.edu.tw

Abstract- For the use of green energy and ubiquitous computing, this study investigates miniature electric generators that are constructed with piezoelectric benders. Electric power is generated by vibratory deformation of piezoelectric benders. Three different designs of piezoelectric generators are created and compared in this study by using mechanics analysis. The result shows that the cantilever design yields more power than symmetric and airfoil designs. Experimental results show that generated voltage rises with not only attached point masses, but also the swing frequency of a swing arm, to which the proposed piezoelectric generator is attached. In addition, At 6.5 Hz swing frequency, the maximum power 0.3 μ W is generated.

Index terms: Miniature Generator, Piezoelectric Bender, Energy Harvesting.