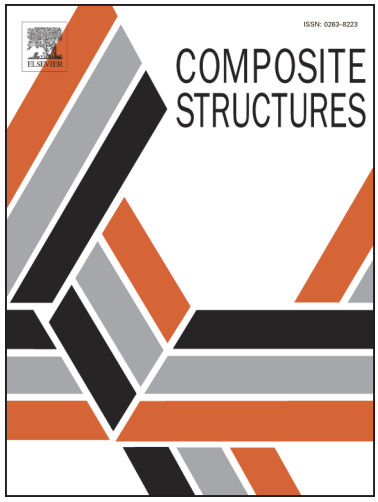

A study on a high efficient cylinder composite piezoelectric energy harvester

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A study on a high efficient cylinder composite piezoelectric energy harvester

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ABSTRACT

A cylinder piezoelectric energy harvester made of composite structures including a stator and a roller is developed to harness energy from ambient vibrations. A corresponding mathematical model for the cylinder energy harvester is developed by a governing differential equation with variable coefficients. The influences of some practical considerations on the RMS (root mean square) of the generated electric power are discussed. The results show that the RMS can reach up to 60.13 KW for a cylinder energy harvester with a radius of 0.5 m and a rotating speed of 1 r/s. This research provides a more efficient and practical technique for harvesting ambient vibration through a design of cylinder energy harvesting device made of composite structures.

Keywords: Cylinder composite piezoelectric energy harvester, Tapered cantilever, Magnetic excitation force, Finite differential method, Frequency tuning.

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