

PROTOTYPE DESIGN OF A PIEZOELECTRIC FLOOR-TILE SYSTEM FOR CANTEEN LIGHTING AT THE BCP MV CAMPUS

ABSTRACT

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Piezoelectric energy harvesting converts mechanical pressure into electrical energy. The canteen at Bestlink College of the Philippines experiences substantial foot traffic, providing a possible setting for a small-scale floor-tile prototype. This study designed a system intended to convert footsteps into electricity for canteen lighting and to promote awareness of sustainable-energy technologies. The study used a quantitative descriptive design. Ten licensed engineers—five civil engineers and five electrical engineers—were selected through purposive sampling and completed a validated researcher-made questionnaire on feasibility and acceptability. The prototype used piezoelectric discs connected in parallel, a bridge rectifier, filtering and smoothing circuits, transistor switching, LED lights, and an Arduino-based voltage monitor. Frequency, percentage, weighted mean, Likert-scale interpretation, F-test, and t-test were used. The prototype received an overall acceptability mean of 3.16, interpreted as “Acceptable.” Presentation received the highest rating (3.50, “Highly Acceptable”). Materials (3.05), cost (3.10), efficiency (3.00), and durability (3.08) were rated “Acceptable.” No significant differences were reported between civil and electrical engineers’ assessments. The prototype was viewed as technically acceptable by the expert respondents. Reported concerns included inconsistent output, low efficiency under repeated use, and component wear. Improvements in materials, piezoelectric-disc alignment, circuit design, and extended testing are needed before application in schools, malls, or public spaces.

RECOMMENDED CITATION

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