Wave Rider: Harnessing Wave Energy for Marine Safety

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The engineering objective of this project was to design, fabricate, test, validate, and solidify a viable solution for generating and maintaining voltage to power marine emergency systems. Typically, 18V are required to power marine safety equipment such as distress signal lights and emergency radios. Therefore, the focus of the project is to generate up to or in excess of 18V to power marine safety equipment. The wave powered generator consists of 6 PVC tubes cut to equal lengths. Each PVC tube is wrapped with 22 AWG wire consisting of 1,000 coils per tube. Inside each tube is a 1in x 4in Neodymium magnet that laterally slides through the tube as it rides over the waves. Each coil is interconnected through a series of bridge rectifiers which convert the AC generated to DC. The bridge rectifiers are connected in series to six 5.5V, 1F super capacitors. The entire device is mounted to a rigid Styrofoam insulation frame that measures 24in x 40in x 4in. Foam wedges were cut to size to provide stability between the frame and device. The device was then placed in two 35 ½ in x 47 ¼ in space bags and deployed at East Matunuck State Beach in South Kingstown, RI. After testing for one hour, 8.4V was generated and stored in the super capacitors. Based on these results, testing with longer durations of time should generate and maintain in excess of 18V, thereby achieving the engineering objective.

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