TRANSFERING WAVE ENERGY TO ELECTRIC ENERGY

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INTRODUCTION

The aim of this study is to make use of wave energy, which is a clean and free energy source. A methodology is developed to transfer wave energy to electric energy. The input data is taken from a real site measurement. The data which was initially wave height vs. time is converted to wave height vs. distance values. The average wave lengths and wave velocity is used to obtain the optimum dimensions of the energy generating system and and calculate the theoretical amount of energy to be produced.

METHODOLOGY

From the up and down movement of a tank, the connected Wheel makes a rotational motion (one way), as shown in Figure1. below. The Wheel turns the circular part of the electric generator, thus energy is produced. The wave height data is converted to useful data and investigated by the means of MATLAB program. The wave length and wave velocity is calculated by using a computer program developed in University of Delaware. The theoretical amount of energy is calculated using the simple energy formulas and efficiency assumptions.

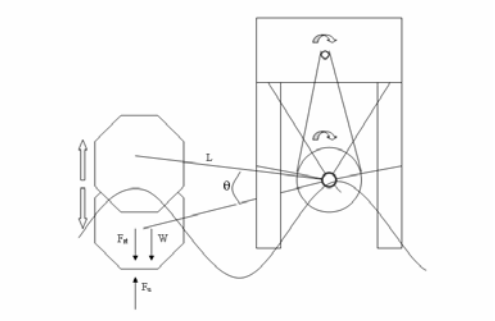

Figure1 The system transferring wave energy to electric energy

RESULTS

The wave length was found to be 48 m. so for the optimum gain of energy a tank with 24m x 24m base area is selected in the calculations. Our system produced a power of 17.1 kW thus an annual amount of 149,796.0 kWh energy can be produced. However, the wave data used in this calculation is a data from a daily normal condition. The wave height was 0.47 m. (which is small in fact) and wave period was 6.75 sec. In case of greater waves and smaller periods, the produced energy amount would be greater.

CONCLUSION

The amount of energy may seem to be small at first sight. However, considering the thousands of kilometers of seasides and the clean&free energy source-the wave, the method seems worth investigated.

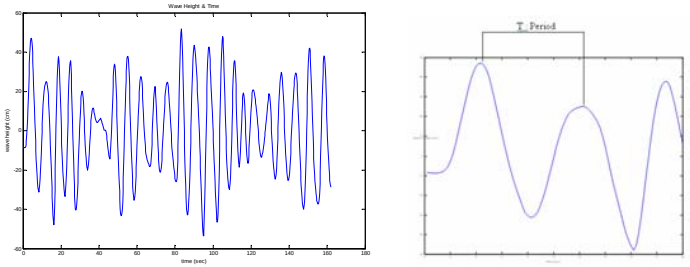

Figure 2 The Wave Used in Calculations

REFERENCES

http://www.coastal.udel.edu/faculty/rad/wavetheory.html

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