IOSR Journal of Engineering (IOSR JEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 09-11

Solar Wave Hybrid Generation

Ranjit Jadhav[1], Bhavik Gore[2], Saurabh Madkaikar[3],Sahil Pathak[4],
Priyanka Sharma[5], Rashmi chaugule[6]

[1]*(Department of Electrical Engineering, Mumbai University, Mumbai- 95*
[2] *(Department of Electrical Engineering, Mumbai University, Mumbai- 95*
[3]*(Department of Electrical Engineering, Mumbai University, Mumbai- 95*
[4]*(Department of Electrical Engineering, Mumbai University, Mumbai- 95*
[5]*(Department of Electrical Engineering, Mumbai University, Mumbai- 95)*
[6]*(Department of Electrical Engineering, Mumbai University, Mumbai- 95)*

Abstract: *This paper presents a brief overview about the design, benefits, risk, and environmental impact of a solar wave hybrid generator. The main intension is to provide renewable energy and decrease the consumption of fossil fuel. Burning fossil fuel causes global warming. Again wastes of nuclear power plant are very toxic. The power generation from waves has growth a huge potentiality. The price of fossil fuel is rising day by day because of its scarcity in nature. As the operating cost of wave power plant is low and uses a renewable source of energy, it is possible to produce power at low price. Existing hydro power plant needs huge dam. This is very harmful for environment. But this generator does not require any dam or any other hazardous construction and this also reduces the installation cost. However it is reliable, sustainable, environmentally friendly power extraction procedure from sea wave Also the solar pv cell is connected to the wave power apparatus so that it can harness power through the sun As the efficiency of solar pv cell is high in cold weather conditions it is a very good source of energy in hybrid along with wave energy*

Keywords*: sea wave energy, renewable source, solar wave hybrid generation*

I. Introduction

Nowadays the humanity has an energy resources lacking and it try to face it with new renewable energies instead of the old ones which are unsustainable and produce emission of CO2 and threaten to finish in few years. In this way, we have to consider the oceans like a good source which can provide us an amount of clean and inexhaustible energy. Three fourth of the world's surface is covered by the ocean. Most of the energy that arrives from the sun to the earth is retained by the water of the seas. The oceans are like a very great solar collector. Along this century, several technologies have been researched to get the energy from the sea. - The Project Solar Wave hybrid generator is a design which is capable of producing electricity 24*7 . It converts the kinetic energy of the waves into usefull electrical energy with vertical motion of the float . This wave generator is coupled with a solar module to produce maximum electricity in a limited area . Description of solar wave hybrid generator

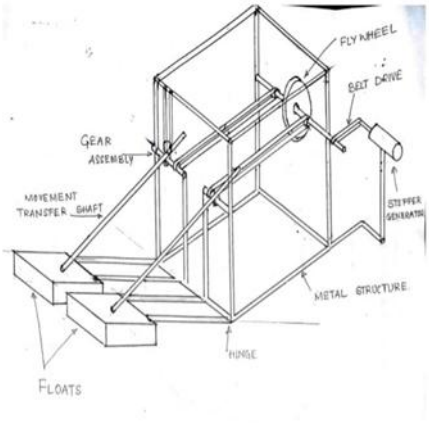
The basic principle of working is that the waves vertical motion pushes the float mechanism up and down . This vertical motion is used to rotate the flywheel . This flywheel is then coupled with a generator via belt drive. A solar panel is placed on the top of the structure and both the power generated are coupled together via charge controller circuit

II. Methodology

2.1 Wave Power Generation

The methodology of sea wave power generation includes Basic design and operation Analysis. Some figures are also included to explain the methodology more clearly.

2.2 Basic design and operation



The proposed power generation system is not a highly sophisticated process. It includes a number of floats attached. The floats go up and down randomly due to the upward wave thrust. Each float is attached with a single shaft.float moves up and down. Each float is connected to another shaft with a rack and pinion arrangement there are sprocket system between crank and shaft. The sprocket system promotes only one way rotation of the shaft. At the time of upward movement of float shaft is engaged with one way bearing, but at the downward movement of float set bearing free from shaft as it is a one way bearing. Therefore shaft rotates when an float rises but the shaft doesn't respond to the downward movement of the float. Actually there is the random movement of float so shaft movement is not uniform. To remove this difficulty a flywheel is connected to the shaft. Fly wheel give the opportunity to the shaft to rotate uniformly. Vibration may hamper the total structure, but total structure will be made considering vibration.

III. Solar Power Generation

The solar pv module will be located at the top of the the structure of the wave apparatus.The solar pv modules are the most efficient in cold tempratures .The main motive of using a solar panel in hybrid with a wave power generator is that along with 24*7 wave power generation we will be able to harness the solar power also during the day-time.Also we have sufficient amount of space in the ocean where we can install these panels above the wave generator apparatus.Inside the ocean there is also no need of frequent cleaning of the solar panels as it is dust free.The solar panels are installed at the top of the apparatus.These solar panels convert the solar energy into electricity and this current is used to charge the 12V battery bank.The battery bank will ensure constant supply of voltage to the load.The key here is the hybridization of both the solar as well as wave power technology through a MPPT hybrid charge controller.The controller is used to combine the power obtained from the solar and wave.the hybrid charge controller gives constant output to the battery and ist does not allow the reverse flow of current from the battery to the solar panel to avoid its damage during the night time when the sun is not available.The power obtained is used for many applications such as street lighting,house-hold lighting,etc.

IV. Enviornmental Impacts

The whole world is under the threat of pollution.It includes water pollution, air pollution, soil pollution etc.The existing power plants are largely responsible for these threats.Nuclear power plant has radiation hazardousness. Dam or other structure may cause ecological imbalances. It also causes river pollution and salt pollution to the tropical area. Diesel or coal power plant emit huge amount of CO2, SO2 and NO2.These causes acid rain and harvest destruction. The emission from diesel and coal power plant is highly responsible for Green House effect that is global warming. Dams used in the production of tidal power canraise tide levels. Damages like reduced flushing, winter icing and erosion can change the vegetation of the area and disrupt the balance.Whereas, the sea wave power plant is free from any kindof environmental pollution.Wave energy is renewable,clean and unpolluted. There is no carbon dioxide or any other by-products released. It doesn't produce greenhouse gases or other waste. As it is renewable, it will help reduce our reliance on the burning of fossil fuels. Wave is always available so it is reliable.The solar energy is also available abundantly and is pollution free.With the hybrid generation we are able to extract maximum power simultaneously

V. Result

While testing the project by manual stimulation we performed the practical test on the wave generator.We got speed of flywheel as 60 rpm.

VI. Conclusion

The technology of ocean wave is still juvenile. It has been fairly possible to demonstrate a power generation plan in this paper. It has been manifested that the proposed plan of power generating from wave has some favorable distinct features which makes it possible to be renewable and eco friendly process.Because of the simple design and easy operation it requires low maintenance cost. It requires very few operating cost that makes it the least priced power.Since it is renewable it can be an everlasting process. Its operating cost is incredibly low.Once you have built it, the energy is free because it comes from the ocean's wave power. It is important to estimate what amount of power generation will make a company profitable. It will attain revenue which wills surplus total cost at 50Mw. Therefore, wave power plant can be constructed due to its sustainability, renewability, eco-friendly and friendly to the Gear system is placed between generator and rotating shaft to drive the generator. Another function of this gear system is speed expedition. Main structure is hanged to the sea bed by rope. This structure makes it easy to move vertically to the response of water level variation. This system facilitates horizontal movement of main structure a little bit to the response of tide.environment. Also the solar power extraction is also a simple but a costly project. Hybridizing it with the wave power generator makes it more cost efficient. The ruuning as well as maintainence cost is also very low as the solar panels are installed in the ocean

References

[1]. Suitable Configuration of Permanent Magnet Linear Synchronous Generator for Wave Power Generation https://ieeexplore.ieee.org/document/4239159

[2]. Design and simulation of a 250 kW linear permanent magnet generator for wave energy to electric energy conversion in caspian seahttps://ieeexplore.ieee.org/document/5348028

[3]. The use of sea waves for generation of electrical energy: a linear tubular asynchronous electricalgeneratorhttps://ieeexplore.ieee.org/document/4449423/

[4]. Renewable Energy World, Ocean energy, (2012).