

A STUDY ON UTILIZATION OF DIFFERENTIAL PRESSURE HEAD CAUSED DUE TO WAVE ENERGY

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ABSTRACT

India, lying in the Northern hemisphere of the globe is rich in natural resources. It is surrounded from oceans from three sides and on the other side we have The great Himalayas which decides the seasonal variations our country. We have three oceans namely Bay of Bengal in the East, Indian Ocean in the South and Arabian Sea in the west surrounding our country. These oceans are continuously under the gravitational pull of moon which gives rise to the tides in the sea. These tides continuously hit the shores with a tremendous amount of pressure. This project aims at utilising this Renewable source of energy and converting the pressure developed at the shores into the electrical energy by the means of wind shafts which would work on the principle of differential pressure caused due to the Oscillating movements of the tides. In this project a small prototype has been made to calculate the amount of energy that can be conserved by rotating the shaft due to the differential pressure and computing the amount of electricity that can be generated from the prototype and implementing it as a whole.

KEYWORDS: Wave Energy, Oscillating Moments,

Hydropower is the electric power generated by the motion of water. The energy made is often clean and doesn't turn out inexperienced house gases like fuel. Hydropower may be generated in varied other ways - mistreatment dams, mistreatment mill wheel, and by capturing the facility of water falling down water. Hydropower is renewable supply and may be use over and again and again. The ocean provides an enormous supply of mechanical energy resources, and as renewable energy technology develops, investment in ocean energy is probably growing to grow. Ocean covers about seventy one of the world surface and is that the largest energy reservoir on the earth's surface. In Asian country their general lineation length of 4670.6miles therefore theres is adequate chance to move this energy reservoirs. The four totally different sorts of ocean energy; periodic event energy; current energy; thermal gradient energy and wave energy.

Ocean covers approximately 71% of the earth surface and is the largest energy reservoir on the earth's surface. In India their general coastline length of 4670.6 miles [1], so there is adequate opportunity to interact with this vast energy reservoirs. The four different forms of ocean energy; tidal energy; current energy; thermal gradient energy and wave energy.

Wave energy has long been thought of one in all the foremost promising renewable technologies. Not solely is that the energy resource large, however it's a lot of dependable than most renewable energy resources—wave power at a given web site is on the market up to ninety % of the time, whereas star and wind handiness tend to be on the market simply 20–30 % of the time. There square measure a quite one

thousand completely different proprietary proposals for wave energy devices.

The potential on the 6000km of outline of Asian nation is regarding forty, 000MW. In Asian nation the analysis and development activity for exploring wave energy started at the ocean engineering centre, Indian Institute of Technology, Madras in 1982. Primary estimates indicate that the annual wave energy potential on the Indian coast is between 5MW to 15MW per meter, therefore a theoretical potential for a coast line nearly 6000KW works intent on forty,000 to 60,000 MW some.

There is only 1 little wave energy plants in Asian nation is pilot plant at Vizinjham Fisheries harbour close to Trivandrum in kerala. Maharashtra government has built project would generates 15 to 20 kilowatt of electricity located at Borya and Budhal villages in coastal Ratnagiri District.

Ocean wave energy is renewable energy offer with great potential, with business viability, Utterly, completely different wave energy conversion systems area unit projected. Buoyant moored devices have a floater that is stricken by the waves. Energy is extracted from this motion. The motion is additionally up ANd down or around associate axis.

The devices used accommodates utterly completely different floaters that move with connectedness each other once waves pass. From this motion, energy is extracted, mostly with hydraulic pumps.

Oscillating water columns area unit chambers

where the water level rises and falls with the waves the air returning into and going out of this chamber drives a wells rotary engine connected to generator. Overtopping devices area unit water reservoirs that area unit stuffed by waves via some moderately wave concentration that increase the wave height.

METHODOLOGY

Oscillating water column wave energy conversion devices carries with it a part submerged chamber hospitable wave forces at the bottom. The wave forces cause the water column at intervals the chamber to rise and fall, driving the air in and out of the chamber generally through a wells or variable pitch kind air rotary engine. Associate electrical generator is then utilised to convert the periodic air flow established into electricity. Periodic water column kind wave energy conversion devices is situated near-shore as a hard and fast structure or offshore during a floating moored-structured configuration

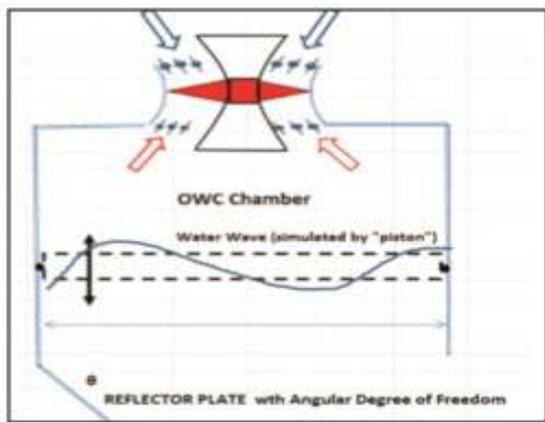


Figure 1

In this project we tend to square measure performing on mounted structure of OWC close to bounds of ocean subjected to continuous wave. The most a part of the system is that the water tight chamber that is opened at the ocean at the lowest. there's already air within the chamber that compresses and decompresses because the wave within the chamber moves. Attributable to the continual distinction in motion within the chamber a high speed air is generated that successively generates extremely controlled air. This controlled air flows to the rotary engine through the conic duct. Because the rotary engine generator moves within the same direction no matter the direction of air flow, the turbines keeps on turning incessantly because the wave level within the chamber rise and fall or else, results to supply electricity through rotary engine.

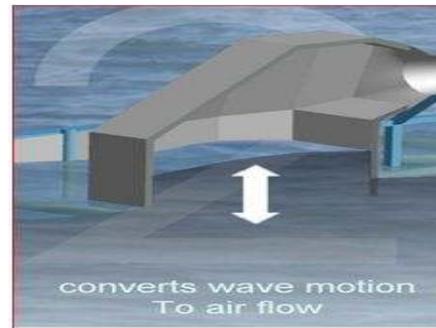


Figure 2

In this prototype experiment we tend to square measure mistreatment 2 plastic bottles connected to every different through swish pipe. One plastic bottle acts as water tight chamber and in another plastic bottle we tend to produce waves through piston. This swish pipe acts as a gap between the water tight chamber and open ocean. The work of piston is to form speedily varied shear stresses and pressure fluctuation on water surface in plastic bottle. This fluctuation creates pressure variation on another plastic bottle. This controlled air flow to the rotary engine and rotate it. This rotation of rotary engine generates electricity that glow zero.7volt LED light-weight.

FUTURE SCOPE

The motivation for national programs for wave power (or to be a lot of precise ocean energy therefore as well as recurrent event power) could be a combination of want for domestic renewable power and hope of a brand new industrial sector making jobs further as exports. If The Indian Government is prepared to speculate and apply the advanced technologies to harness the energy from ocean waves, it'll become the primary as a result of seventieth of the Indian outline is roofed by ocean solely. Thus we will say that the approaching future is awaiting the renewable energy resources with the augmentation of wave energy. However to realize this talent full technology is required. The advantages to society offered by wave energy include:

- 1) Providing a brand new, environmentally friendly and simply assimilated grid connected choice for meeting load growth and legislated Renewable Portfolio normal necessities,
- 2) Avoiding the aesthetic issues that plague several infrastructures outcomes.
- 3) Reducing dependence on foreign energy provides, increasing national security and reducing the chance of future fuel value volatility,

4) Reducing emissions of greenhouse gases by displacing fossil fuel-based generation, and 5) stimulating native job creation and economic development; that square measure noticeably necessary for the nations like Republic of India.

Environmental Impact

Oscillating water columns have no moving parts in the water and therefore pose little danger to sea life. Offshore OWCs may even support sea life by creating an artificial reef. The biggest concern is that OWCs cause too much noise pollution, and could damage the natural beauty of a seascape. Both these problems could be fixed by moving OWCs father of shore.

RESULTS

Test Results

Table 1

Height of Shaft from the base(cm)	RPM of Shaft	LED Glow (Secs)	Power
25	12	3	7mW
28	15	4	9mW
30	16	4	9mW

CONCLUSION

Thus it can be concluded from the prototype that even a small amount of pressure difference electricity can be generated at a shore. With a opening cross sectional area of around 50 cm² in a prototype around 9mW power can be generate , the total coastline length of India is and even 50% of coastline are utilised then around watt of power can be generated.

FUTURE SCOPE

It is a well known fact that not much fossil fuels are available for future generation therefore for sustainable development we need to switch for the renewable sources of energy and tidal energy at the shores comply with the same and have not gain much importance yet instead of their huge potential. Thus, future of power generation would be shifted to this form of energy sooner or later.

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