ELECTRICITY GENERATION BY USING EXPERIMENTAL SETUP OF COMPRESSOR & TIDAL WAVES

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ABSTRACT

Tidal energy is renewable energy which exist in nature. so we are using tidal energy to compress the air which can be used later in many ways in which air will be compressed by cylinder and piston in which piston will be operated by waves. we are designing the structure which will be built in the sea where high wave deflection is generated in which the chamber will work as a cylinder and the wave will work as a piston the whole structure including sea wave will work as air compressor. On the structure there will be one inlet suction and outlet suction. Inlet suction will suck the air as waves goes downward andthen through outlet as waves come upward both suction will be attached to a one way valve to restrict one direction air flow in this way many chamber will attach to each other in series due to which we will get constant pressure difference in both suction inlet and outlet then that pressure difference or that energy can be used to generate the electricity through turbine.

INTRODUCTION

Though innovations for using wave energy are numerous, limited efforts had been attempted to use the wave energy [1]. Waves occurring in ocean contain considerable power. It's a historical art to harness wave energy. Since 1890 attempts have been made in commercial scale to utilize the wave energy [2]. There are several research augments in progress spread over different countries [3]. The present work focuses on recovering energy from waves using a linear permanent magnet generator with other instrumentation and electrical accessories. The ocean is never still. Whether observing from the beach or a boat, we expect to see waves on the horizon. Waves are created by energy passing through water, causing it to move in a circular motion. However, water does not actually travel in waves. Waves transmit energy, not water, across the ocean and if not obstructed by anything, they have the potential to travel across an entire ocean basin

OBJECTIVE

An our earth 71%of area is covered with sea water which is saltey which is useless for us so our main objective is that bring that area into use you might thinking how it is possible? The sea surface is fully filled with water and salt which has high density than water approximately (1029kg/m3) when air pass upon the surface then between air and sea water friction take place due to that friction the uneven surface get formed that uneven surface which is get formed is has a certain motion which is known as wave or sea wave so our focus to generate energy from that sea wave which is available in free of cost with no limit and the generation of energy should be ecofriendly in nature and should be a alternator of thermal power plant which is dangerous for our nature. The thermal power plant is also plays the important role in global warming and also covered the huge amount of useful and agricultural land to overcome such a power plant our project is best

LITERATURE SURVEY

VIKAS.M et.all : The phenomenon of rise and fall in the ocean waters, called tides, is due to the attractive force between the celestial bodies; Sun, Earth and the Moon. When the ocean water rises to a maximum extent, it is called spring tide and when they fall off to the lowest possible extent, it is called neap tide.With progress in technology, the usage of electric and electronic devices is exponentially increasing and there is a need to produce extra power other than the existing, in order to meet the future

demands. Tidal energy can be considered as one of the best existing source of renewable energies.Unlike the wind, solar, thermal energy etc., tidal energy is something that has a long term perspective and it can be forecasted more accurately. Tidal energy is clean and not depleting. Because of these features it is unique and suitable to use it as a power generating source in the future. There are various types of tidal power plants across the world with varying tidal elevation. Also, the method of conversion of tidal energy into electrical energy is site specific. But generally, the method followed for extracting energy from tides is similar to the conventional hydroelectric power plants. In this paper, the tides at some locations across the world and along the Indian coast, tidal power plants across the world, resource allocation of tidal power plants, advantages and disadvantages of tidal power will be reviewed from the literature.

METHODOLOGY

To obtain the objective in which to use wave energy into our useful energy in which we are designing the structure which will be built in the sea where high wave deflection is generated in which the chamber will work as a cylinder and the wave will work as a piston the whole structure including sea wave will work as air compressor. On the structure there will be one inlet suction and outlet suction. Inlet suction will suck the air as waves goes downward and then through outlet as waves come upward both suction will be attached to a one way valve to restrict one direction air flow in this way many chamber will attach to each other in series due to which we will get constant pressure difference in both suction inlet and outlet then that pressure difference or that energy can be used to generate the electricity through turbine.Before beginning the project, the first step was to assess the project scope and research topic. The next

CALCULATIONS

Basic assumption

- Density of sea water [average]=1029kg/m3
- Wave crest [average]=1 to 3 m
- Air velocity of sea [average]=100 to 200km/h
- Wave velocity of sea [average]=50 to 90km/h
- Temperature of sea water [average]=250C
- Specific gravity [average]=1.029

Equation of continuity

The Equation of Continuity and can be expressed as:

$$m = \rho i1\ vi1\ Ai1 + \rho i2\ vi2\ Ai2 + \ldots\ldots + \rho in\ vin\ Ain$$
$$= \rho o1\ vo1\ Ao1 + \rho o2\ vo2\ Ao2 + ... + \rho om\ vom\ Aom \quad (1)$$

Where, m = mass flow rate (kg/s)

ρ = density (kg/m3)

v = speed (m/s)

A = area (m^2)

With uniform density equation (1) can be modified to

$$q = vi1\ Ai1 + vi2\ Ai2 \ldots + vin\ Ain$$
$$= vo1\ Ao1 + vo2\ Ao2 + ... + vom\ Aom \quad (2)$$

Where, q = flow rate (m3/s)
ρi1 = ρi2 = . . = ρin = ρo1 = ρo2 = = ρom

For a simple reduction (or expansion) as indicated in the figure above - the equation of continuity for uniform density can be transformed to

vin Ain = vout Aout (3) or

vout = vin Ain / Aout (3b)

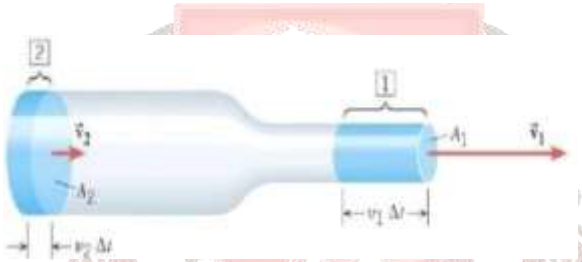
Example - Equation of Continuity 10 m3/h of water flows through a pipe with 100 mm inside diameter. The pipe is reduced to an inside dimension of 80 mm.
Using equation (2) the velocity in the 100 mm pipe can be calculated (10 m3/h) (1 / 3600 h/s) = v100 (3.14 (0.1 m)2 / 4) or v100 = (10 m3/h) (1 / 3600 h/s) / (3.14 (0.1 m)2 / 4) = 0.35 m/s

Using equation (2) the velocity in the 80 mm pipe can be calculated (10 m3/h) (1 / 3600 h/s) = v80 (3.14 (0.08 m)2 / 4) or v80 = (10 m3/h) (1 / 3600 h/s) / (3.14 (0.08 m)2 / 4)=0.55 m/s

EQUATION OF CONTINUITY

The mass flow rate has the same value at every position along a tube that has a single Entry and a single exit for fluid flow

ρ1A1v1=ρ2A2v2 SI Unit of Mass Flow Rate: kg/s



PROJECT SETUP

ADVANTAGES

- Clean energy with low cost
- Diversion to renewable energy
- Environment Friendly

- The energy is free – no fuel needed, no waste produced.
- Not expensive to operate and maintain.

DISADVANTAGE

- Suitable to Certain Locations
- Effect on marine Ecosystem

FUTURE SCOPE

ALTERNATE SOURCE OF ENERGY The never-ending motion of the sea surface in the form of wind waves constitutes a source of continuous energy. About 1.5% of the incoming energy from the sun is converted to wind energy. Much part of the energy from the winds is transferred to the sea surface, resulting in generation of waves. This energy is carried to coastlines throughout the world, where it is dissipated as the waves break. If this source can be tapped properly and used economically, it can generate a sizeable portion of world energy needs. Extraction of energy from waves is more efficient than directly from wind, since wave energy is concentrated through interaction of the wind and the free ocean surface. The sea behaves like an immense energy collector whereby the wind energy, transferred to the large sea surface, is stored as mechanical energy in waves. The inertia of waves provides this short-time storage and smoothens the high variability of the wind over time and space. Though the potential along the 6000 km of the Indian coast is quite substantial, estimated to be around 40,000 MW, the energy is less intensive compared to that in more northern and southern latitudes. The ocean waves are random in nature. The power available in random sea is expressed as P = 0.55 Hs2Tz kW per metre length of wave crest, where Hs is the significant wave height (defined as average of one-third of highest waves) in metres, and Tz the zero-crossing period in seconds. From this relation, for a significant wave height of 2 m and a zero- crossing period of 7 s, the available power is 15 kW/m of wave front..

CONCLUSION

Wave energy is not expensive to operate and maintain, no fuel is needed and no waste is produced. However, it depends on the intensity of the waves and needs a suitable site where waves are consistently strong. The infrastructure must be able to withstand very rough weather.Wave power lies not in huge plants but in a combination of on-shore generation and near shore generation (using a different technology) focused on meeting local or regional needs. If this system prove to be economically possible, only 0.1% of the renewable energy within the world's oceans could supply more than five times the global demand for energy.So we can obtain compressed air with wave energy which can be used for many application without affecting our surrounding at very low cost.

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