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Tidal Wave Energy Large Scale Conversion Technology

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Abstract

The objective of this paper is to describe how we can get the maximum amount of working force from tidal wave energy. The paper starts with defining various forces acting on a floating object. Then describe the theory of how unnecessary forces can be opposed except the force which is useful and how this useful force can be increased hugely, how we can use the force safely. Afterward, method then calculating for a 21.5 MW hydropower from tidal wave, using some freehand drawings. Finally conclusion states the advantages.

The unlimited source of energy ocean tide has the potential to generate an unlimited amount of electricity and to provide unlimited water demand. Since 1799 till now energy companies are not able to harness sufficient amount of energy from this constant source of energy. Existing projects are small, critical technology and so are not economic. Tidal energy basically is a physical water movement, so compare to solar and wind, harnessing energy from tide should not so difficult.

Tidal force on a floating object has two elements:
1) Horizontal force (HF): Is a one-directional force creates by tidal flow/current.
2) Vertical force (VF): Is a bidirectional force creating by tidal wave (with gravity).
Application of Vertical force (VF) and Horizontal force (HF) Tidal horizontal force (HF) (and with others external any kind of wind forces) on a floating object can be opposed by anchor it properly (by using minimum four long-distance anchors) so that the vertical force (VF) remain almost same. This vertical force (VF) is useful and it can be very much useful as easily increase this vertical force (VF) by increasing the size of the object. This bidirectional vertical force (VF) is very much suitable for pumping purpose. Therefore, the vertical force (VF) of the tidal wave on a floating object can be huge.

Movement of this anchored ship due to the tidal wave is only vertical and the amount of energy it carries is big. The vertical upward force of this ship can be useful by installing pump protected by RCC structure using vertical upward force of the wave continuously sufficient water pumping possible for hydro power station as shown below in my hand sketch. This is a very easy technique to harness huge energy from ocean tide as already running some small projects. Compare to the other hydro power stations dam, big reservoir, big catchment area not required so cost effective. Reject ships can be used as a floating object so that form a ship city. Some anchored big ships can provide Electricity and Water demand of a big City.

Hence, we can conclude that to generate 21.5 MW electricity from tidal wave we have to anchor a ship (total weight 10,000 ton) on the ocean wave height 3 m, need to be build a 119 m × 119 m × 3 m size reservoir from (127-3)=120 m above the sea level, have to be install a pump under the anchored ship of cylinder diameter 10 m, cylinder height ≥ maximum wave height in the installation area and a 21.5 MW water turbine generator. Considering the open space available in the ocean, we can install lots of ships. Anchored big ships on the big wave can take a big role in the solution of future energy. HLs is a very easy technique to harness energy from ocean tidal energy as already running some small projects. Capacity can be increased as required by increasing the size of the object and pump very easily. Expensive waterproof devices are not required for this easy technique.
Compare to the existing hydropower stations dam, big reservoir, big catchment area not required so cost-effective.

Advantages include:

- Zero-emission
- Low-cost renewable energy
- Very safe
- Reject ships can be used as a floating object so that form a ship city
- Very simple pumping operation so that pump can be design for any size of wave
- Continuous pumping so no need a big reservoir for hydropower station
- Economic
- Easy technology
- Reliable and Unlimited

Keywords: Anchor; Electricity; Floating object; Pump; Ship city; Tidal wave energy