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DESIGN AND FABRICATION OF FLOATING SOLAR POWER PLANT

Saurav Gawali, Mayur Bandkar, Akshay Jadhav, Rohan Kanade

¹(Department of Mechanical Engineering, Viva institute of technology/Mumbai University, India)

(Department of Mechanical Engineering, Viva institute of technology/Mumbai University, India)

(Department of Mechanical Engineering, Viva institute of technology/Mumbai University, India)

(Department of Mechanical Engineering, Viva institute of technology/Mumbai University, India)

Abstract : The constant depletion of the fossil fuels and high energy demand focuses us to renewable energy sources which are not only the future unlimited sources of energy it is also eco-friendly and sustainable for the environment. even though solar power generation, the major problem is the requirement of land which is scarcely available in the world and its cost. A new era in solar power I.e. floating solar power plant will solved this issue. This floating solar plant can be installed in any water bodies which will not only decrease the cost of the land but also will raise the amount of generation with the cooling of water.

The hight energy demand and the constant consumption of the fossil fuels lead us to shift our focus to renewable energy sources which are not only the future unlimited source of energy, it is also eco-friendly and viable for the environment. hydro and wind though are renewable sources but area specific. solar energy on the other hand can be installed in any place. The major issue with the solar energy is the requirement of land which is scarcely available in the world and even costly to get. but floating solar plant can be installed in any water bodies which will not only reduce the cost of the land but will increase the amount of generation with the cooling effect of water.

Keywords - solar photovoltaic, floating solar system, types of floating structures for solar power plants, renewable energy

I. INTRODUCTION

The significant problem in our country is power crisis. Around 70% coal is used for generation of electric energy. Irrigation and industry production is get affected due to load shedding, daily shutdown, etc. So we need to move towards renewable energy sources to generate electricity.

Renewable energy sources are of very importance as they would power our future. Solar energy power plant which make use of the sun's energy needs sufficient space for installation. It is a well-known fact that out of the 510 million Km² surface area of earth, a mere (appx.) 29% is covered with land. In additionally (at some locations) the land may be of importance and it may not be possible to dedicate (some) space for solar energy power plant. In a country where cities are closed-packed and agricultural land is limited, installing solar power plant may not be feasible. This is where floating solar power plant can come to our rescue. Floating PV power plant as the name suggests are floating bodies of solar power plants on water.

Floating solar system has PV concentrator which is very light weight and it floats on water bodies, mounted on anchored rafts float on the surface of water reservoirs, quarry lakes, and tailing ponds. Some of systems exist in France, India, Japan, Korea, the United Kingdom and the United States. The floating solar system reduces the need of costly land area, it also saves the drinking water that would otherwise be lost due to evaporation, reduces the growth of algae. The solar system shows a higher efficiency as the panels are kept in cooler temperature than they would be on land area. The floating platforms are 100% recoverable, utilizing high density polyethylene which can withstand ultraviolet rays and corrosion.

II. PROBLEM STATEMENT

2.1 Problem Statement Problem no 1 :- (Based on fossil fuel) • Every year Enormous amount of electrical energy is produced by using fossil fuels

• Use of fossil fuel leads to production of toxic gases which directly affects humans ,animals, plants ,aquatic life and deteriorate our environment immensely . Problem no 2 :- (Based on land occupation by large population)

• Day by day our population is increasing immensely which leads to land occupation.

Solution :-The states which are sea based like Maharashtra Kerala, Karnataka , Gujarat, Odisha, west Bengal ETC , in this states we are going to place solar panel in sea to produce large amount of electrical energy which will be very beneficial over fossil fuel and and overcome land occupation problem.

2.2 Objectives: To Produce Large Amount Of Electricity By Solar Panels Placed In Sea Water With Features Like Horizontal And Vertical Damping System , Sun Rays Concentrator, Solar Panel Rotator With Bidirectional Servo Motor , Stability System And Many More which eliminates many problems faced by existing model.

2.3Material of construction

- Fiber Reinforced Plastic
- Timber Wood With Stainless Steel As Cover Sheet
- Fiber glass Over Wood

2.4 Advantages

- East to installation
- Economical over long period of time.
- Eco friendly to aquatic life
- No generation of any kind pollution
- Reduction in Land occupation by solar plants on land

2.5 Disadvantage

- Initial investment cost is high
- Require Daily Maintenance
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2.6 Application

To Produce Enormous Amount Of Electricity

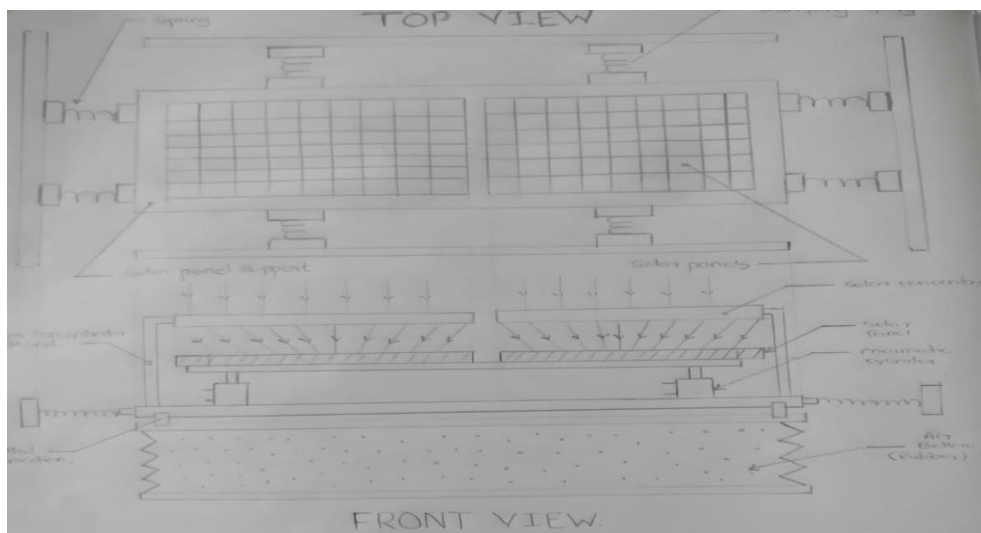


Fig.1 Design of model

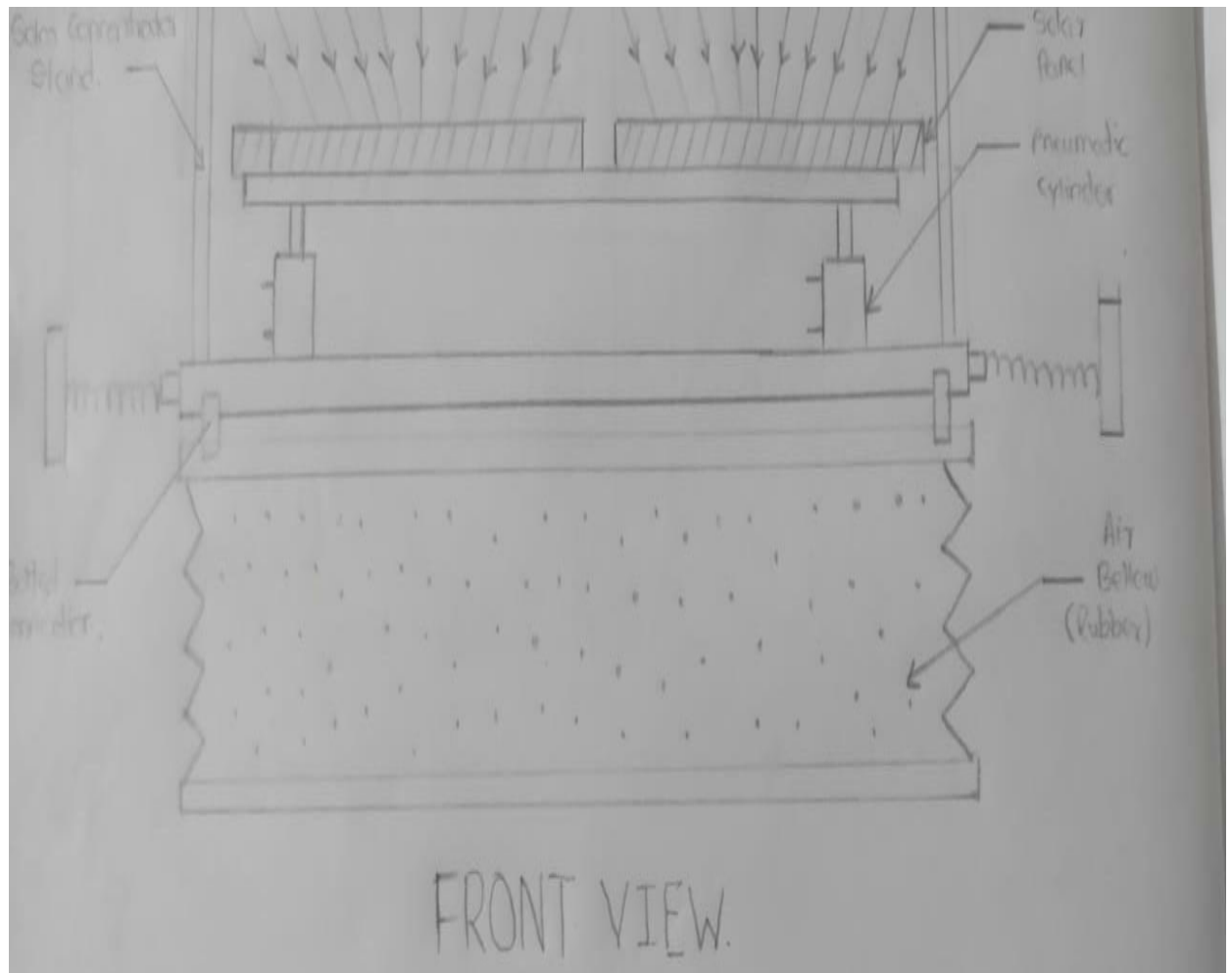


Fig. no.2 Side view

III. METHODOLOGY

- Base Structure Is Manufacture By FRM Material Incorporated With Bellows (At Bottom) And Buffer Springs(at Four Sides) Of Structure , To Damped Horizontal And Vertical Vibration Occurred Due To Wind And Waves.
- Then comes Solar Panels With Solar Stand manufacturing For Solar Concentrator With Base Of Fiber Structure Incorporated With Pneumatic Cylinder And Motor To Rotate In 360 Degree Controlled By Arduino.
- The Voltage Produced By Solar Panel Is Regulated By Solar Intelligent Regulator Whose Main Work To Reduce Voltage Fluctuations and to supply voltage at constant current.
- Solar Concentrator situated above solar panel with solar stand to Converge All Sun Rays On Solar Panel To Increase Efficiency .
- Rain sensor senses the rain and gives info to arduino to actuates the pneumatic cylinder to close solar panel
- Submersible pump located below structure used to clean dust on solar panels regulated by arduino.

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- MOTIONS:-**
- Up and down Motions is controlled by linear servo motor incorporated with motor
 - Rotation motion is controlled by motor incorporated by arduino.

Five major problems that the old model have which have been overcome by our new proposed model are as follows:-

Old model Problems	Proposed model	Components used
Affected by wind and waves of sea	Overcome by damping system	Bellows and buffer spring
Solar energy production reduction by sun rotation	Overcome by sun rays tracking mechanism	By Arduino With Biaxial Servo Motor Or By Pneumatic Cylinder And Compressor
Affected by rain falling directly on panels	Rain sensor	Arduino with rain sensor
Instability of solar panel due to wind velocity	Overcome by anemometer	Anemometer incorporated with motor
Dust on solar panel	Overcome by water pump system	Submersible pump

IV. CONCLUSION

In overall process we started the project with taking caring of crucial points like problem definition, requirement and economy. After finding the problems in old model we started with literature review and analyzed the information related to project topic and compiled it. After analysis of literature we get insight on , which aspect we have to give our efforts on selected project and drawn a rough proposed model . Hence we conclude that we had done everything related to selected topic which will be adequate to use this information to make physical model.

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