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DESIGN AND FABRICATION OF A SOLAR BOAT

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ABSTRACT

The environment awareness has been developed worldwide so progressively and turns into the instant needs over the last few years. Researchers in all disciplines have a particular responsibility of development which is environmentally friendly and lead towards sustainable future development. Solar energy is a comsic renewable energy source which has massive energy existing as heat and light and can convert it into electricity. Besides the domestic uses, solar power can be utilized as the alternative of the oil in boat's fuel and capable of minimizing the water pollution and fuel cost as well. The purpose of this research is to design and fabricate a boat based on solar power. The boat will be conducted by the energy processed from solar by minimizing environmental pollution and fuel cost. Besides, for any cloudy or emergency condition, a backup power system integrated with the photovoltaic cell will drive the boat to make the system more secured. Both mechanical and electrical part of the boat has been designed which is found more reliable, efficient and economic.

KEYWORDS- Eco-friendly Ocean, Fuel Consumption Reduction, Solar Tracking System, etc.

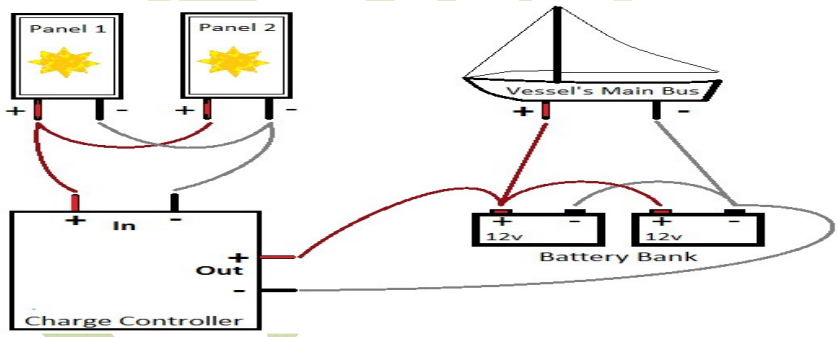
INTRODUCTION

The conventional sources of energy are getting exhausted due to their continuous use. There are numerous researches on alternatives available for conventional energy. It is concluded that the solar energy should be preferred than any other alternatives due to their availability. We are concentrating on one fact that whatever the load is there on the boat is, it balanced on the water and whatever power required driving the boat is just a push force. In this project we are making a small working model of solar boat. The boat that runs on solar power only. The conventional ship is runs on fossil fuels. The solar power can be effectively and successfully utilized for Boat.

PROBLEM IDENTIFICATION

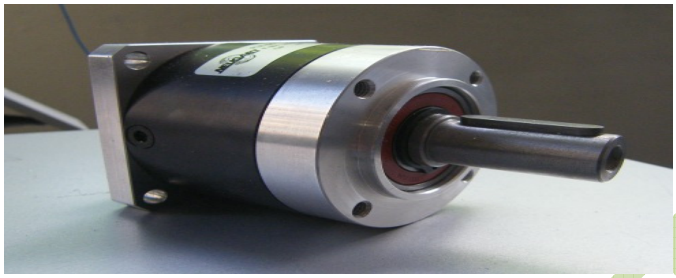
1. The ordinary boat uses diesel fuel to run the generator of the boat, and then supply electric power to run the electric motor. So, find the use of new alternative energy to substitute the usefulness of fuel. The solar electric boat is one of the alternative energy that can possibly solve this problem.
2. The solar electric boat cannot be used at night because there is no sunlight to produce energy. However, this problem can be solved by using rechargeable batteries that can supply current to the electric motor of the solar boat at night.

EXPERIMENTAL SETUP



COMPONENT INFORMATION-

SOLAR PANNEL-
Solar panels use light from the sun to generate electricity. A solar panel is a packaged, connected assembly of photo Voltaic cells through photovoltaic effect.
BATTERY-
For our ship, we assume that the average electrical power necessary during the cruise is 48 W
MOTOR-
The motor used in solar ship is essentially driven by magnetic attraction and repulsion between the permanent magnets in the motor stator and the rotor which is an electromagnet powered by solar panel. The motor RPM varies directly with voltage.



HULL-

Hull is the watertight body of ship. The line where the hull meets water surface is called water line. The structure if hull varies depending on vessel type. The basic considerations are: Must float and requires carrying motor and solar cells. Must be constructed from water resistant materials. Must be stable and not roll over.

PROPELLER-

A propeller is a type of fan that transmits power by converting rotational motion into thrust. A conventional water propeller is the most commonly used type of propeller. The propeller must transfer all the solar panel power to the water to drive the ship. Keep the shaft angle low to maximize forward thrust component and minimize the vertical thrust component.

CONCLUSION

The design of a Solar-Electric Boat for tourists' transport along the coast, in the rivers, in the lakes has been presented. With our system, it is possible to replace the standard fuel engine with an electric one, by accepting a loss in power, and without changing the weight and the dimension

of the boat. Our boat has greater price in comparison to an equivalent boat equipped with traditional propulsion. Currently to manufacture a solar-electric boat there are extra cost due to photovoltaic plant, battery bank and management control system. These additional costs are partially compensated by reduction of operation costs; in solar-electric boat there is no consumption of fuel and the costs of maintenances are relatively lower. within ten years the extras costs are amortized. Besides, the great advantage of the use of renewable energy produces indirect socio-economic advantages; ecosystem preservation, reduction of CO2, NO*x*and SO*x*emission, etc. In this project we have proposed an innovative management of charge/discharge for battery. With this management, we have optimized the batteries life, and during the navigation we have a real time control of the navigation autonomy. Besides we have designed ship with zero pollution and very low running costs; all the necessary energy for the navigation has origin by renewable. Electricity produced by photovoltaic is safer and more environmentally benign than conventional sources of energy production. However, there is environmental, safety, and health issues associated with manufacturing, using, and disposing of photovoltaic equipment. The manufacturing of electronic equipment is energy intensive. The electricity produced is higher than the one necessary to manufacture the photovoltaic modules and the energy break-even point is usually reached in a period from three to six years.

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