Review paper on Solar Powered River Cleaning Machine

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ABSTRACT- The work has done looking at the current situation of our national rivers, lakes, ponds etc which are dump with crore liters of sewage and loaded with pollutants, toxic materials, debris etc in our locality. The government of India has taken initiative to clean rivers and invest huge capital in many river cleaning projects like "Namami Gange", ''Narmada Bachao'' and many major and medium projects in various cities. By taking this into thought, this machine has designed to scrub stream water surface.

I. INTRODUCTION

The project is related to solar powered river cleaning machine. The work has done by looking at current situation of our national river, lakes which are dump with cores litres of sewage and loaded with pollunt, toxic materials, debris etc..now a day conventional method is used for collection of floating waste are manual basis and by means of boat thrash skimmer etc..and diposite near the rivers. these methods are very costly and time consuming. This drawback is eliminate in our project by using river cleaning machine. This machine consist of propeller for the movement of the whole structure in water which driven by the bldc motor, the conveyer is provided on front side of structure to collect and remove the wastage and hyacinth, garbage from water bodies. by this way our machine will help in river and lake surface cleaning effectively, efficiently and eco-friendly. This will ultimately result in reduction of water pollution and lastly the aquatic animals death to these problem will reduced.

OBJECTIVE

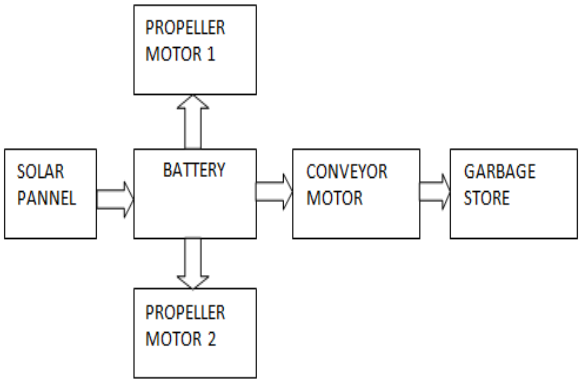
1. Maintain the design cost of machine less as compare to machine which available in market
2. Conventional methods used for collection of floating waste are manual basis or by means of boat, thrash skimmers etc.
3. To overcome the difficulty of removing waste particulate floating on water energy

LITERATURE REVIEW AND PROBLEM DEFINITION

As Earth's pollution continues to grow, peoples are putting ever increasing pressure on the planet's water resources. In a sense, our oceans, rivers, and other inland waters are beings "squeezed" by human activities. According to the estimate almost 70% of the surface water.

Water hyacinth is a freshwater weeds species. It is free floating plant and draws all its nutrient directly from water. The weeds is mainly found in inshore and shallow area to which it is swept by currents and sometimes in patchy off shore area. It spreads fast in shallow bays and inlets with mud bed surfaces. Lake Rankala's, River Panchaganga's & Krishna location's shallow depth and nutrient enrichment provide favorable condition for its proliferation.

METHODOLOGY



BATTERY

The an electrical battery may be a device consisting of 1 or additional chemical science cells with external connections provided to power electrical devices like flashlights ,smartphones, cars.

EV Batteries are quite different from those used in consumer electronic devices such as laptops and cell phones .They are required to handle high power and high energy capacity within limited space and weight at an affordable price.

ELECTRIC MOTOR:
Brushless DC motor additionally called electronically commutated motor or synchronous DC motor.
The Synchronous motors steam-powered by DC electricity via AN electrical
converter or shift power provide that
produces AN AC electrical phenomenon to
drive every section of motor via shut loop controller.
Controller provides pulses of current to the motor winding that control speed and torque of the of the motor
TYPES OF MOTOR:
• Brushless Motor
• Brushed Motor

DESIGN OF FLOAT
Float is special type if construction on which whole unit (conveyer, batteries, garbage's water hyacinth, motor and motor shaft is to be mounted the function of float is to support the whole unit, bear the load of entire mechanism on the water surface the float is going to be the back bone of the entire machinery

DESIGN OF PROPELLOR
For any float or boat propeller design is very important for the moment of particular boat. The basic idea behind the propeller design is that propeller should overcome the resistance offered by the both for the moment of both. Hence for propeller design first of all we have to find out the resistance offered by boat.
The resistance is depend on following factor
1. Speed of the boat
2. Density of fluid
3. Area of the boa

WORKING PRINCIPLE

we are fabricating the river cleaning machine. The collecting plate and chain drives are rotating continuously by the motor. The collecting plate is coupled between the two chain drives for collect the waste materials from river. The collected wastages are thrown on the collecting tray with the help of conveyer. Our project is having propeller which is used to drive the machine on the river. The propeller is run with the help of two PMDC motor.

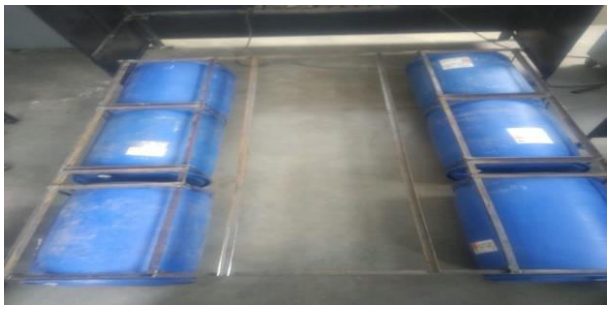


Fig 3 Model Diagram

CALCULATIONS

- Propeller Design

Total Resistance= Ff+Fr
where ,
Ff= Frictional Resistance
Fr=Residual Resistance
Ff= cf*k1
Where,
k1=refrance force=1/2*ro*v^2*As
Where,
ro=density of fluid= 1000kg/m^2
v=velocity of boat=1m/Sec
As=hulls weighted area=1.92 m^2
Fr=Cr*k2
Where,

Cr=residual resistance coefi.=0.8
Power required to move boat= F*v
Where,
F=total resistance+weight of assembly
From calculation,
K1=962.5
Ff=96.25N
k2=269.45
Fr=215.56N
Total resistance=371.81N

F=total resistance weight of assembly
F=371.81+(600*9.81)
F= 6257.81N
Power=6257*1=6257watt
Diameter of propeller=1 m
N=velocity*60/PI*D=20rpm

Length of propeller blade=0.325m^2
Width of blade=0.28m^2

Motor for Propeller (BLDC Motor)

Rated Power -1000W
Rated voltage -48Volts
Speed -3000rpm
Rated Current -24am

Solar panel specification

Power= 320watt,4 Panel
Optimum Operating voltage=24v
Optimum Operating current=13.33A
Weight=25kg

Battery Calculation

Battery Backup=Load*Utilization time/Vtg

Battery Backup=1500*3/24=187.5

Required batteries=100Ah four batteries

Battery Voltage =12volt

Battery Weight=60kg

Capacity=100Ah

Overall Dimensions

Length= 9.3 ft.

Width= 7.1ft.

Height=5ft.

Barrel

1)Diameter=69inch.

2)Length=3ft.

ADVANTAGES

1) Initial & maintenance cost is less.
2) It is very useful for small as well as big lake, rivers Where garbage is present in large amount.
3) Easy replacement and installation of various parts
4) Skill worker not required to drive the system self Propel.
5) Environment friendly system.
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FUTURE SCOPE

• The machine can be designed for deep cleaning
• Solar panel can be used for providing power to the Machine.
• Capacity of the machine can be increased for cleaning big rivers and lakes.

APPLICATIONS

It is applicable to scale back pollution in rivers & ponds.
It is useful to remove the sediments present in swimming pool to keep it clean.

CONCLUSIONS

The project “River Waste Cleaning Machine” has Designed which is very much economical, easy to operate
And helpful for water cleaning and it can be modified with
More cleaning capacity and efficiency

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