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Design of River Cleaning Machine

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Abstract: This project stress on design of the stream waste cleansing machine. "River cleansing machine" a machine that involves the removing the waste dust from water surface and safely dispose from the water body. The work has done gazing the present scenario of our national rivers that are dump with large integer liters of waste product and loaded with pollutants, toxic materials, debris etc. due to increase in pollution within the type to waste debris; it's hampering the lifetime of aquatic animal and make their life at risk. A machine can elevate the waste surface dust from the water bodies, this can ultimately lead to reduction of pollution. The main aim of the project is to cut back the man power, time consumption for cleansing the stream. During this project we've got store the energy within the battery and used this energy for stream cleansing with the assistance of a motor and conveyor arrangement.

Index Terms - Motor, Propeller, Conveyor, Cutter, Arm

I. INTRODUCTION

The "River cleanup machine" utilized in that places wherever there's waste trash within the water body that square measure to be removed [1]. This machine is comprises conveyer mechanism that collect & take away the wastage, garbage & plastic wastages from water bodies. This conjointly cut back the difficulties that we tend to face once assortment of trash turn up[2]. A machine can carry the waste surface trash from the water bodies, this may ultimately lead to reduction of pollution. Also this machine cannot harm the aquatic animals due to its vibrating motion. It consists of Belt drive mechanism that lifts the trash from the water[3]. the utilization of this project are going to be created in rivers, ponds, lakes and other water bodies for to clean the surface water trash from bodies[4]. This machine is fully safe and doesn't pollute the lake. This project aims to reduce the pollution of the rivers lakes and ponds by keeping in mind the safety of the aquatic animals[5].

II. LITERATURE REVIEW

The water pollution is very important problem in rivers, ponds and water bodies near Godavari River at Nashik. Due to increase in water pollution in the form to waste debris; it is hampering the life of aquatic animal and make their life in danger[6]. India is holy country & during lots of festival like ganeshvisarjan, navratridurga puja & mainly Siahnsthkumbhmela there is lots of water pollution of Godavari River at Nashik. Similarly sometimes the aquatic animal tends to eats surface waste debris considering it as a food; which ultimately cause the death of animals[7]. Due to polluted water many skin diseases to human kind are observed. So that to reduce the water pollution we are trying to make river cleanup machine. "River cleanup machine" a machine which involves the removing the waste debris from water surface and safely dispose from the water body. The river cleanup machine works on hydropower to extract waste water debris, plastics & garbage from Godavari river at Nashik[8]. Explained that the motive of the project is to automate the sewage cleaning process in drainage. A machine consisting of a chain and sprocket and driven by a motor is made use of in the cleaning process. When the motor runs, the chain starts to circulate and it makes the lifter to move upwards. The waste material is lifted by lifter teeth and stored in a collector bin. Once the collecting bin is full, the waste material is removed from the bin manually[9]. Fabricated a river cleaning machine which makes of a turbine driven alternator to produce electricity. When water flowing in the river falls on turbine the turbine begins to rotate. The alternator generates electricity. This drives the vertical conveyor belt and horizontal conveyor belt through timing chains and sprockets. With the help of spur gears both the conveyor belts are connected with each other[10].

III. LIST OF COMPONENTS

1. Blades
2. Arms
3. Conveyor belt
4. Propeller
5. Body

IV. DESIGNING OF COMPONENTS

4.1 Blades: The cutting resistance (R) has been considered proportional to the cutting area, measured in the motion plane of the blade. Infinitesimal value for the single blade cutter bar

$$R = E \times \frac{da}{dx}$$

da =effective area moved by the blade

dx=infinitesimal displacement

From this formula we calculated the resistance and from this we are finalizing this dimension

1. Dimension -55 x 10

A. Length -55cms

B. Width -10cms

2. Number of cutters -10

3. Material – stainless steel

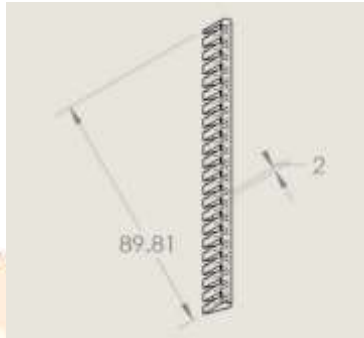


Fig. 4.1 Blade

4.2 Arms: Arms is hooked up to boat for cutting purpose. A cutting mechanism is connected to the arm for cutting the plants within the river. The arms can go down within the river and cut the plants. The dimintions of the arm is given below:

1. Dimension -110 x 9

A. Length -110cms

B. Width -9cms

2. Material – Hard fiber , wooden stripes

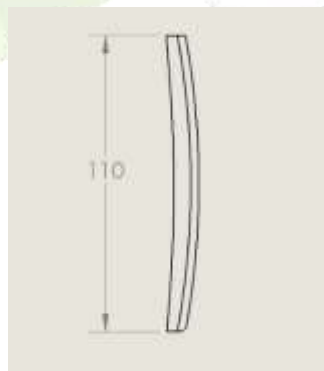


Fig. 4.2 Arm

4.3 Conveyor belt: Here we have used the aluminium net for conveyor belt cause pores in it will easily pick up the trash and move it towards collecting tray and store it in. The dimension of the conveyor belt is as follows:

1. Dimension -78 x 42

A. Length -78cms

B. Width -42cms

2. Number of rollers -3

3. Material – PUC pipes, aluminium net

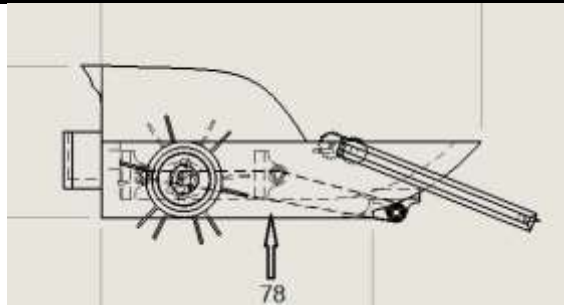


Fig. 4.3 Conveyor Belt

4.4 Propeller :The drive shaft is a rod or tube used to carry rotation from the gear motor. Propellers are used to give a direction to the vehicle. Its made up of fiber on which metal plates are fixed externally. propeller was made by using the toy car wheels. Impeller was made by using the metal sheet with the help of following dimension and material:

1. Radius-11cm
2. Impeller Blade length-13cm
3. Number of impeller-6
4. Materials – a)for propeller-plastice
b)for impeller-cast iron (SAE20)

To protect the metal impeller from the corrosion also used oil paint.

$$\text{Torque } (T) = F \times r = F \times \frac{D}{2}$$

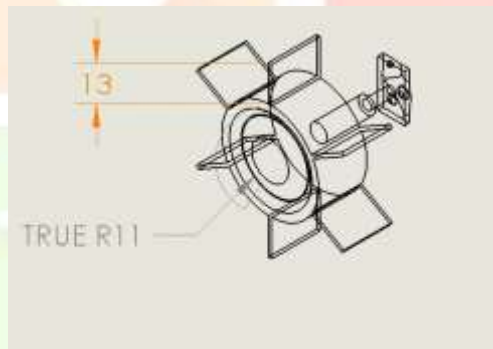


Fig. 4.4 Propeller

4.5 Body: The body of the boat is made up of fiber sheets as they are less in weight. It will protect the boat from drowning. For balancing the boat the center of gravity is calculated by the formula given below:

$$\text{Center of gravity } (x_{cg}) = \frac{m_1gx_1+m_2gx_2+m_3gx_3}{(m_1g+m_2g+m_3g)}$$

and hence the body of the vehicle is sucessfully designed.

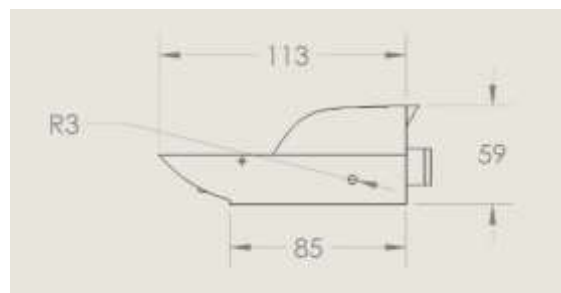


Fig. 4.5 Body

The final design will look like this. All the dimensions of the vehicle is shown in given figures.

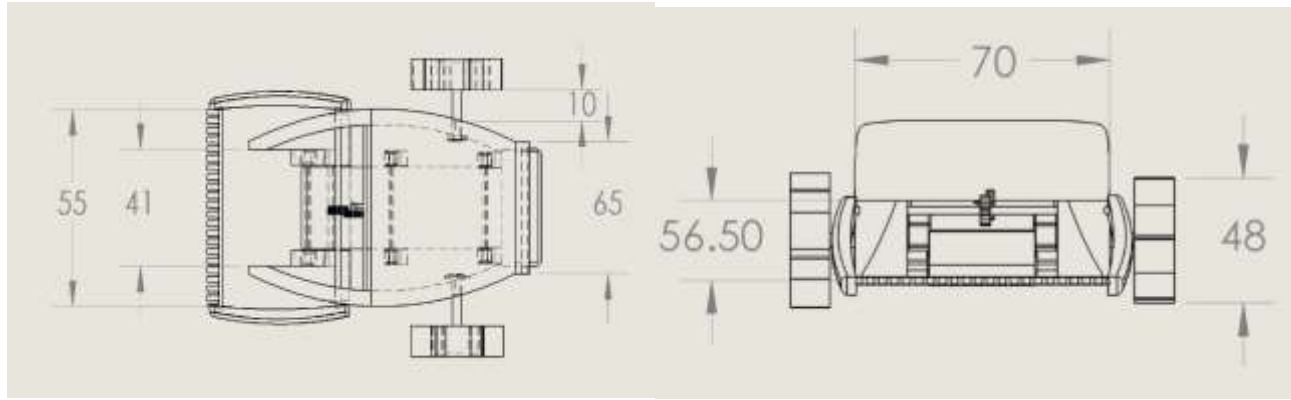


Fig.A Top view

Fig. B Front view

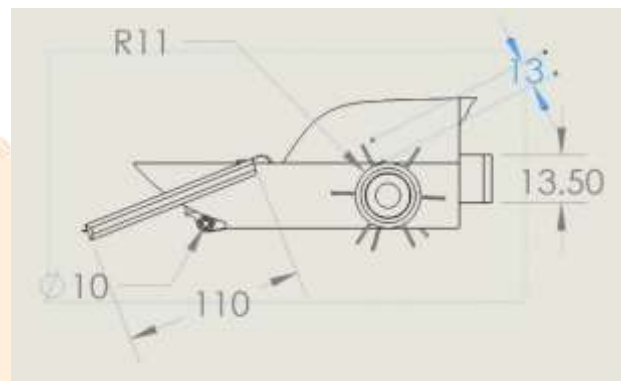


Fig. D Side view

V. APPLICATIONS

1. It's applicable to reduce pollution in rivers & ponds.
2. It's helpful to reduce the environmental marine pollution at stream, Lake.
3. It's conjointly helpful in fishery plant to collect dead fishes and solid impurities in waste water.

VI. CONCLUSION

This are the dimensions finalized on calculating and experimenting the result are very satisfactory. On the basis of these result we can conclude that it is an innovative method of minimizing manual stress and thus very much reliably stabilizing the in the river . This is safe project carried out by us made an impressive task in the environmental purpose and it is very useful for the small scale works. Although this system able to collect the trash from the lake with human intervention . The objective of the project was successfully achieved.

VII. REFERENCES

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