



3D Modeling of River Cleaning Machine

¹Dr.Imran A. Khan, ²Himanshu S. Dhandre, ³T.M. Kartikey Pillay, ⁴Mayur R. Chaudhari

¹Associate Professor, ²B.E Mechanical Student, ³B.E Mechanical Student, ⁴B.E Mechanical Student

¹Mechanical Engineering Department,

¹Priyadarhini College of Engineering, Nagpur, India

Abstract: Water pollution has been a serious reason behind environmental concern. Most of the water bodies like rivers, lakes, streams, etc. are extremely contaminated. Floating wastes are a serious supply of pollution. Machines are designed to get rid of the floating waste. Any such machine will involve the usage of some supply of power that is still uneconomical. Therefore it had been thought by North American nation to make a machine that might be straightforward and low-cost and conjointly not requiring any external power supply. Taking into thought that a flowing stream or stream usually develops water heads at completely different locations in its course of flow, it absolutely was set to form use of the heads out there to provide hydropower that might be accustomed run an appropriately designed machine. This project focuses its attention to provide and develop a tool which will with success be ready to clean numerous solid wastes from the rivers in Republic of India. This project takes into the account the matter of giant work force, time and capital needed in improvement of rivers in Republic of India. During this project completely custom motors and chain drive has been used for automation of stream improvement operation saving each the time, men and cash.

Index Terms - Motor, Propeller, Conveyor, Arm, Solid work.

I. INTRODUCTION

Water is major supply of life. Although seventieth of ninety-eight is roofed with water, concerning ninety seven of it's within the variety of oceans and therefore not acceptable human consumption [1]. The remaining third-dimensional is held on in numerous sources like glaciers, rivers, lakes and under-ground aquifers. Rivers and lakes that area unit found on the earth's surface are noticeably essential for the humanity. Stream water is employed for irrigation that in turn provides food to the individuals. Rivers conjointly maintain the ecology of the region and convey in prosperity [3]. Sadly, most of the rivers and lakes have gotten contaminated. This is often because of human actions like material possession domestic and industrial wastes into such water bodies. So rivers like Ganges, Yamuna and Narmada are getting extremely contaminated [4]. Even the South Indian stream Kaveri is suffering from pollution. Solid waste that floats on the stream surface may be a reason behind serious concern. Disposal of solid waste commencement opening towards minimizing surface pollution [2]. Some machines are developed to clear the solid waste found on the surface of the water bodies. This project aims at coming up with a model that uses principles of mechanical motion, dynamics moreover as digital style, to style and fabricate stream cleanup boats to be used everywhere Republic of India and therefore the world [5].

II. LITERATURE REVIEW

In many religions all around the world water is used to celebrate religious and holy festivals which in general cause water pollution. This is deemed hazardous for aquatic life because it makes the water improper and polluted. For example the five day Durga Puja celebrated in India afar the festival ends the idols are disposed of in water. Problem arises from the material used in making these idols in most cases, this is plaster of Paris, metals, various chemical-based paints; all of which disintegrate in the water and pollute it. Due to this reason the need of water cleaning mechanisms arises and various types of water cleaning boat are developed [6].

It has been mentioned that the Ganges River in Republic of India is one amongst the worse impure rivers. Concerning twenty nine million litres of waste product is being dropped within the Ganges River together with toxins. They need recommended the usage of pedal operated boat with the conveyor connected thereto for grouping garbage from the lake. With the use of this conveyor it's potential to gather the rubbish like plastic baggage, plastic bottles, drinkable cans, food wrappers, paper bags, straws, (marine debris) etc. With this system no fuel is concerned [7].

The remote operated stream cleansing machine has been modelled. The aggregation plate and chain drive IS rotating endlessly by the motor. The collection plate is coupled between the 2 chain drives for collect the waste materials from stream. The collected waste is thrown on to the assembling receptacle with the help of conveyer. The machine incorporates a propeller that is employed to drive the

machine on the watercourse. The propeller is run with the assistance of 2 PMDC motor. The whole device is management led by RF transmitter and receiver that controls the machine remotely [8].

Mechanical management ways involve the complete or partial removal of plants by mechanical suggests that, including: gather, shredding, mowing, rototilling, renovating, and chaining. Mechanical management ways will also be accustomed expedite manual gather activities, including hand gather, raking, and cut stump management, with the utilization of motor-driven machinery. These management techniques for plants rarely lead to localized wipe-out of the species, but rather, cut back target plant abundance to non-nuisance levels [9].

This project stresses on development and Analysis of the stream Water improvement Machine. The work has done keeping in mind at the present scenario of our national rivers that are generally dump with crore litters of waste matter and loaded with pollutants, toxic materials, debris etc. the govt. of India has taken charge to scrub streams and invest immense capital in several river cleaning projects [10].

III. COMPONENTS USED

3.1 Blades: Blades are used for cutting purpose. A stainless steel cutter is used here. It is used to cut the plantations which are deep inside the water. A reciprocating mechanism is used in the blades, when the blades reciprocates it will cut the things which comes in contact of it.



Fig 3.1 Blade Mechanism

3.2 Arms: Arms are attached to boat for cutting purpose. A cutting mechanism is attached to the arm for cutting the plantations in the rivers. The arms will go deep down in the river at the time of cutting otherwise it will be unable to remove the shrub from the river.



Fig 3.2 Arms

3.3 Conveyor Belt: It is basically flexible endless strip of fabric or linked layer of any material which are driven by rollers. Its used in transporting parts and materials. Here we have used the aluminum net for conveyor belt because pores in it will act as hooks and catch the shrubs and slide it easily and store it in collecting tray at the back.



Fig 3.3 conveyor belt

3.4 Propeller Shaft: The drive shaft is a rod or tube used to carry rotational motion from the gear motor to the propeller. Propellers are used to give a direction to the river cleaning machine. It's made up of fiber on which metal plates are fixed externally using araldite and m-seal. To protect the metal impeller from the corrosion we have painted it using anti corrosion oil paint.

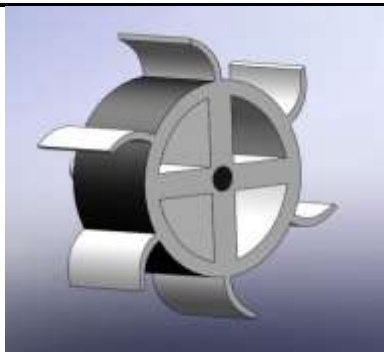


Fig 3.4 Propeller Shaft

3.5 Body: The outer body of the boat is made up of light but hard fiber sheet because fiber sheets are less in weight and can easily float in water and also a body of fiber can carry certain load on it. It will protect the boat from drowning.



Fig 3.5 Body

IV. ASSEMBLY MODELING

The following steps were performed to generate the CAD model of River cleaning machine; with the help of operation tool, the 2D diagram has been created and converted to 3D. This CAD model of River cleaning machine was further used to cut underwater shrub collect it with the help conveyor belt. This is what it looks like once the model becomes full following CAD design.



Fig No.4.1 River cleaning machine

V. WORKING

The main purpose of machine is to cutting the shrubs and collects the waste from the water and collects them in the collecting tray which was connected to the backside of the boat. The boat is operated by the remote controller. The conveyor belt and propeller are rotating continuously by the motor. The conveyor belt is attached to the collecting tray for collecting the waste material easily. Bearing was used for the frictionless rotation of conveyor belt. Propeller was used to driven the boat on the water surface of river and also used for turning the boat in all directions. Arm cutting mechanism was used for cutting the shrubs. The arm cutting mechanism was driven by motor. The blade was attached between the two arms for the cutting purpose. The used propeller is run with the help of two gear motors. The total electrical device is controlled by transmitter and receiver which use to control remotely. Battery is the main power source for the whole running operation.

VI. CONCLUSION

The need of this project is very wide and confines to develop a river cleaning boat because it is used to clean the river and pond. This boat is very effective and useful in the dirty river and pond where humans cannot easily reach because it is operated by remote control. The water cleaning boat is easy for handling and transportation due to its light weight. Skill worker is not require for operating the water cleaning boat due to its remote operated function. The boat can be operated by remote from long range of 1 km. The cutting blade is very useful for cutting the underground trees and shrubs. Waste is easily collected by conveyor belt.

CAD model is developing with the help of data accumulation and design calculation. A model of water cleaning boat was generated using SOLID WORK 2016 software. It is environment friendly machine due to its noiseless and air free pollution operation. After the completion of the model, it has reached the conclusion that its mechanism and design of the model is safe.

VI. REFERENCES

- [1] Mr. P. M. Sirsat, Dr. I. A. Khan, Mr. P. V. Jadhav, Mr. P. T. Date, "Design and fabrication of River Waste Cleaning Machine", IJCMES 2017
- [2] Mr. Abhijeet. M. Ballade, Mr. Vishal. S. Garde, Mr. Akash. S. Lahane and Mr. Pranav. V. Boob, "Design & fabrication of river cleaning system", IJMTER Volume 04, Issue 2, [February-2017].
- [3] Basant Rai, "Pollution and Conservation of Ganga River in Modern India", International Journal of Scientific and Research Publications, Volume 3, Issue 4, April 2013
- [4] Emaad Mohamed H. Zahugi, Mohamed M. Shanta and T. V. Prasad, "Design Of Multi-Robot System For Cleaning Up Marine Oil Spill", IJAIT Vol. 2, No.4, August 2012.
- [5] Prof. N.G. Jogi, Akash Dambhare, Kundan Golekar, Akshay Giri, Shubham Take, "Efficient Lake Garbage Collector By Using Pedal Operated Boat", IJRTER Volume 02, Issue 04; April 2016
- [6] M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar, Dr. N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arunkumar, "Design and fabrication of remote controlled sewage cleaning Machine", IJETT - Volume-45 Number 2 - March 2017
- [7] Ankita B. Padwal, Monica S. Tambe, Pooja S. Chavare, Reshma K. Manahawar, Mitali S. Mhatre, "Review Paper on Fabrication Of Manually Controlled Drainage Cleaning System", IJSER, Volume 8, Issue 3, March-2017
- [8] Sheikh Md Shahid Md Rafique, Dr. Akash Langde "Design and Fabrication of River Cleaning Machine" November 2017
- [9] Pankaj Singh Sirohi, Rahul Dev, Shubham Gautam, Vinay Kumar Singh, Saroj Kumar, "Review on Advance River Cleaner" 2017
- [10] Madhavi N. Wagh, Kashinath Munde "Design and Analysis of River Water Cleaning Machine" July 2018

