Garbage Cleaning System for River

Miss. Vaishali A Kadam[1], Prof. Navnath T. Manjare[2], Mr. Akash R. Chaware[3], Mr. Vikas N. Kamble[4] Mr. Karan D Kalbande[5]
Department Mechanical Engineering
[1,2,3,4,5] D.Y.Patil College of Engineering Ambi, Pune

Abstract- *In this project the proposed concept is to replace the manual work of garbage collection in water sources by automated system. Now-a-days even though automation plays a vital role in all engineering applications, the proper disposal of garbage from water sources is still a challenging task. In today's date workers are employed for collecting a garbage from water sources, that's why workers comes into contact of germs ,bacteria which affects on their health. To overcome this problem and to save human life we implement a design "Garbage Collection system" for water sources. We have designed our project in such a way that it can collect all the garbage from water sources without human contact with garbage. In this system cleaner is a machine which helps to protect the environment from different kinds of environmental hazards through the promotion of waste management by the removal of garbage from the water sources. These waste when not removed these blocks the drainage system thereby causing flooding. The garbage collection system has three major parts which are the Propeller, the conveyer and the pedalling mechanism, all are required for its effective functioning. The system can collect garbage at a faster rate than workers. Therefore we recommend use of this system by various river cleaning government agencies for prevention of environmental hazards, water pollution of rivers, dams. Our project is inspired by "Bharat Swachata Abhiyan"*

Keywords- Garbage collection system ,Chain conveyer, Cycle pedal

I. INTRODUCTION

The drainage pipes are using for the disposal and unfortunately sometimes there may be loss of human life while cleaning the blockages in the drainage pipes. To overcome this problem and to save human life we implement a design "River Cleaning Machine". We designed our project to use this in efficient way to control the disposal of wastages. Automatic Garbage Cleaning System for River. Using auto mechanism proposed to overcome the real time problems. With the continued expansion of industries, the problem of sewage water must be urgently resolved due to the increasing sewage problems from industries of the surrounding environment. The waste and gases produced from the industries are very harmful to human beings and to the environment. Our proposed system is to cleaning and controls the drainage level using river cleaning machine. In this system we used motor or pedal, chain, driver, bucket, frame, drums, waste collection tank.

Nowadays, the environment problems arise in many towns in Indonesia. These problems come along by developing activities such as construction of houses, offices, and other business areas. The Environment problems occur due to several reasons; they are the low budget allocation on environment management and public awareness in protecting the environment. The Environment issue which comes up from year to year and still cannot be solved is about garbage and waste from various places dispose into rivers. Those garbage can clog water flow, induce the water become dirty, smelly, and often over flow so Government's efforts have not been running at maximum. There are many garbage found and clog the stream flows in the river, dumps into the branch of the river, piles up at the doors of water, in ditches, small streams and pose shelter illegal waste, which would damage the surrounding environment. Therefore, we propose the idea to overcome this problem by making "River Cleaning Machine" as a Model "Garbage Cleaning System for River" is expected to be the appropriate solution at now.

Drainage systems are blocked most times by garbage like nylon, plastic bottles, and empty cans, wood which cluster together and find their way into the "River Cleaning Machine". If these garbage are allowed to flow they will end up flowing down to recreational beaches used for tourism purposes making a scene not pleasurable to the eyes else these garbage flow to residential sites where they are burnt in a way of getting rid of them, thereby causing climate change. "The River Cleaning Machine" are cleaned when there is no water in them i.e. When it is not raining, but when it is raining the drainage systems cannot be cleaned because of the harsh conditions of the rain which no one would volunteer to endure to ensure garbage does not enter into the drainage systems. There have been several attempts to develop equipment which would deal with the garbage when it is raining. The major examples of this include the net system which entails using a net to block the entrance or exit of the drainage system for the net to sieve out the net and the perforated metal sheet covering system using a protective metallic covering which is perforated on the drainage systems with the view of sieving out the garbage. But these methods

proved less than 20% efficient. In severe conditions, as the holes of the net and the perforated metal sheet continued sieving at some point it get blocked leading to flooding. In developing countries the "River Cleaning Machine" are not free from waste materials. It is a dumping ground for most common men on the streets . The problem of finding garbage in the Garbage Cleaning systems is inevitable, so the least thing to do is to resort to waste management. Waste management entails a given order for waste prevention and minimization.

The purposes of this research is
1) To determine the design of river cleaning system
2) To know the performance of "River Cleaning Machine"

II.THEORY

A. Introduction

Garbage is defined as the flow of used water from homes, businesses, industries, commercial activities and institution in which lot of impurities are present. The impurities may be debris, papers, plastic. This water when mixes with water resources, those resources get polluted and so in order to avoid pollution of those water resources we have to remove that water contained impurities. And our project will help in maintaining good quality of by removing all this garbage

B. Past researches

By doing some research in the past we can say that it is seen that major factors that affect the strength of the machine are design parameters, material selection, raw material defect, and surface imperfection. It is seen that design parameters i.e. operating modes, operating temperature, and imperfections, as we seen as temperature increases the strength of material decreases.

C. Working Principle

Floating in drain are lifted by teeth which is connected to chain. This chain is attached by gear driven by motor. When motor runs the chain starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste storage tank.

- *The Propeller:*

  This mechanism generates energy needed for the entire machine system through the action of running water in the drainage system. The propeller constitute of eight arms which are flat and are connected to a center rod, also the center rod is rigidly fixed to the two rigidly fixed holding poles across the sides of the drainage system. The arms are interconnected and are being connected to the center rod through a central axis which ensures swift rotation of arms. The arms are of the same width with the drainage systems but only marginally different but is higher in length allowing the arms to easily oppose the running water. The arms also, due to its lightness are pushed by running water to cause rotation. The arms also have soles that are flat that help them to balance and resist motion from oncoming water effectively. The motion is passed out through chains drives A and B. Chain drives A and B are connected to the second and third mechanism respectively

- *The Chains Drives :*

  The links in the drainage system cleaner consist of gears and chains drives, which transmit motion to other parts of the machine system. Chain drive A is connected to the cleaner which allows it to make a motion to sieve out the waste materials in the drainage system. The cleaners move in opposite direction to the propeller, the motion provided by Chain drive is then linked to other gear which allows the Chain drive to provide a mechanism in the cleaner that moves opposite the direction of the running water,while chain is directly linked to the mechanism.

- *The Bucket:*

  The cleaner sieves out the waste materials. Just like the propeller, the cleaner consist of eight arms which are also connected to a centre rod to allow motion. It receives it source of energy through Chain drive from the propeller. Unlike the propeller the cleaner does not wholly constitute of a flat metal but half of it is made of a net to effectively sieve the running water without any form of blockage. The soles of the arms are also made of nets which help the arms effectively sieve the water running in the drainage system.

- *The chain And The chain Mechanism:*

  The chain mechanism is the third part of the system which helps to remove waste materials that has been removed by the cleaner to the trash can it is made of a light metal, it is receives its own energy through Chain B from the propeller and it is also connected to one of the holding poles of the cleaner. The is mechanism made up of two gears; gear 1 and gear 2. The gears are connected with the ratio of 4:1 which helps gear be to create a complete rotatory motion, gear 2 constitutes a flat curved "S" shaped metal connected on top of it and also attached in its center to the holding pole. It aides movement of the chain to and fro the axis. Also the pan itself is held by a smooth rod which allows it to spin thereby releasing material from the cleaner to a trash can. A

trash can is dropped at a close distance allowing the chain to pour in the materials from the bucket.

- *Drum*

Plastic drums are use for floating the mechanism, which has ability to sustain maximum amount of load easily in water for floating. It's just a ordinary water storage drums.

In this approach combine all your researched information in form of a journal or research paper. In this researcher can take the reference of already accomplished work as a starting building block of its paper.

Jump Start

This approach works the best in guidance of fellow researchers. In this the authors continuously receives or asks inputs from their fellows. It enriches the information pool of your paper with expert comments or up gradations. And the researcher feels confident about their work and takes a jump to start the paper writing.

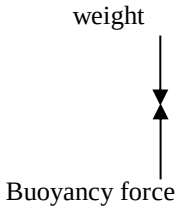
- *Shaft:*
-

The shaft is used in our project for move the chain conveyor. The shaft is rotated with the help of high torque low speed dc motor. The material of shaft is mild steel. The diameter of shaft is 12 cm and 80 cm length.

Shafts form the important elements of machines. They are the elements that support rotating parts like gears and pulleys and in turn are themselves supported by bearings resting in the rigid machine housings. The shafts perform the function of transmitting power from one rotating member to another supported by it or connected to it. Thus, they are subjected to torque due to power transmission and bending moment due to reactions on the members that are supported by them. Shafts are to be distinguished from axles which also support rotating members but do not transmit power. Axles are thus subjected to only bending loads and not to the torque. Shafts are always made to have circular cross-section and could be either solid or hollow. The shafts are classified as straight, cranked, flexible or articulated. Straight shafts are commonest to be used for power transmission. Such shafts are commonly designed as stepped cylindrical bars, that is, they have various diameters along their length, although constant diameter shafts would be easy to produce. The stepped shafts correspond to the magnitude of stress which varies along the length. Moreover, the uniform diameter shafts are not compatible with assembly, disassembly and maintenance. Such shafts would complicate the fastening of the parts fitted to them, particularly the bearings, which have to be restricted against sliding in axial direction. While determining the form of a stepped shaft it is borne in mind that the diameter of each cross-section should be such that each part fitted on to the shaft has convenient access to its seat. The parts carried by axle or shaft are fastened to them by means of keys or splines and for this purpose the shaft and axle are provided with key ways or splines. The bearings that support the shafts or axle may be of sliding contact or rolling contact type. In the former case the journal of the shaft rotates freely on thin lubricant layer between itself and bearing, while in the latter case the inner race of the bearing is force fitted on the journal of the shaft and rotates with the shaft while outer race is supported in the housing and remains stationary. A shaft is joined with another in different ways and configurations. The coaxial shafts are connected through couplings which may be rigid or flexible. The material of shaft is mild steel.

III CALCULATIONS

Buoyancy force:



Given Data:

Size of drum = 400 lit = 0.4 m^3
Density of water (ϱ) = 1000 kg/m^3
Weight of water of volume of tank = 0.4x1000
= 400 kg

Upload force

= 400x9.81
= 3924 N

Download force

= weight of total assembly

main frame –material-M.S.Steel
= ϱ_{steel} = 7850 kg/m^3

Length of L channel

8x1 m = 8 m
8+4 = 12 m L

length of square tube 4x0.3 m = 1.2 m
1.2+2 = 3.2 m
01x2 = 2m

Volume of L channel = (25x25x1200)-(22x22x1200)

= 7500000-5808000
= 1692000 mm3

Volume of L channel = 1692x10^{-9}
= 1.692x10-3

Volume of □ = 10x10x3200
= 320000 mm3
= 3.2x10-4 m3
Weight of L = volume Lx ϱ
= 1.692x10-3 x 7850
= 13.2822 kg
Weight of = ϱ x volume
= 7850 x 3.2x10-4
= 2.512 kg
Weight of frame = weight of L + weight of □
= 13.2822 + 2.512
= 15.7942 kg + 0.6631
= 16.4573 kg
Weight of conveyor = L = 2x1.06 = 2.12m
= 2x0.6 = 1.2m
= 2x0.66 = 1.32m
= 2x1.22=2.44m
= 7.08 m
= 7080 mm

Volume L = (7080x25x25)-(7080x22x22)
= 4425000-3426720
= 998280 mm3
= 9.9828x10-4 m3

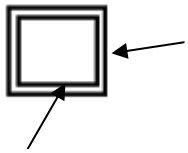
Weight of L = 9.9828x10-4 x 7850
= 7.836498 kg
Shaft
Area of shaft = π/4 x D2 = π/4 x122
= 113.097335 m2
Length of shaft = 1500 mm
Volume of shaft = 1.66645x10-4
Weight of shaft = ϱ x v
= 7850 x 1.69645x10-4
= 1.331720 kg

Weight of 4 sprocket = 4 x 250 gm
= 1000 gm
= 1 kg
Weight of chain = 6 kg
Weight of conveyor = weight of frame + shaft weight + sprocket weight +chain wt

= 7.9 kg + 1.4 kg + 1 kg + 6 kg
= 16.3 kg

Weight of conveyor = 16.3 kg

Weight of frame = 16.4573 kg



Length = 220 x 4
= 880 mm

Volume = (25x25 x880) – (23 x23x880)
= 550000-465520
= 84480 mm2

Weight = ϱ x v
= 7850 x 8.448x10-5
= 0.6631 kg

Weight of propeller = 5 kg
Weight of collection tank = 10 kg
Weight of operator = 60 kg
Weight of driving mechanism = 8 kg
Weight of Turning mechanism = 5 kg
Weight of drum = 5 kg

Total weight activity downward
= frame + conveyor + propeller + collection tank +operator + driving
Mechanism + turning mechanism + drum

= 16.4573 + 16.3 + 5 + 10 + 60 +8 + 5 + 5
= 125.7573 kg

126 kg
Downward force

Buoyancy force

400 kg

Fig. Garbage Cleaning System for River

Fig. Bucket

IV. CONCLUSION

If called into actio n to reduce flooding and climate change. It was found out that at the absence of some variables like heavy winds, the propeller moved at a rate relative to the velocity of the running water. The cleaner functioned more effectively during the heavier rains which had more volume of running water with garbage and high velocity. The pan functioned effectively. It moved at a rate relative to the velocity of the running water and at the rate of the propeller. The results and findings have shown the scope of design and specifications of the Garbage cleaning system for river makes it work effectively. It has also highlighted how efficient the machine could be

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