



e-ISSN:2582 - 7219



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 4, Issue 6, June 2021



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 5.928



9710 583 466



9710 583 466



ijmrset@gmail.com



www.ijmrset.com



Design of Water Cleaning Management System for Nag River

Prof. Fanindra Katre¹, Mr. Himanshu V. Khapekar², Mr. Praful S. Kadamdhad³, Mr. Prathamesh P. Bowade⁴, Ms. Aachal N. Janbandhu⁵, Ms. Poonam G. Bhongade⁶

Assistant Professor, Department of Civil Engineering, Guru Nanak Institute of Technology, Nagpur, Maharashtra, India¹

UG Students, Department of Civil Engineering, Guru Nanak Institute of Technology, Nagpur, Maharashtra, India^{2,3,4,5,6}

ABSTRACT: India is a holy country and during festival like Ganesh Visarjan, Navratri, Durga Puja and daily waste dumping etc. there is a lot of water pollution done on nearby water bodies. These water pollutions are a very serious concern, for e.g.: Futala Lake. Due to increase in water pollution in the form of waster debris, it is hazardous to the life of aquatic animals as they can consume it and choke or die instantly. Not only the aquatic animals but also humans are in danger due to this problem. As this water is used for irrigation and drinking purpose it is not safe for us humans. This water when used for irrigation can infect the vegetable and can cause health issues for us. If drink then it can cause respiratory as well as diseases caused by water like jaundice and can also cause skin disease. As per a report published every year, we dump 29 crore liters of sewage waste in the Ganga river. Government and NMC are constantly working to remove the waste from these water bodies. One such moment was started by NMC under the guidance of 'Sir. TUKARAM MUNDE' to clean the Nag River in Nagpur in 2016. In total over 5,000 tons of garbage and other waste was removed from a 17.68km stretch of the Nag River, starting from Ambari's overflow point to the confluence with Pili River beyond Bharatwada during a 15-day campaign. While doing this The Times of India newspaper gave the report of the amount of waste daily being dumped in the river to be around a ton. The major populations to be dumping waste in the rivers are those living in the slum areas. Every year the NMC is approximately removing at least half a ton of waste from nearby lakes.

I. INTRODUCTION

City of Nagpur is named after the Nag River. Nag River originates from a lake called Ambazari, which is located to the west of Nagpur City. Catchment of Ambazarilake was the present MIDC area and also some area beyond. Hence recharge of the lake was perennial. Overflow of lake constituted the river Nag. There is another lake called Gorewada, which is to the north-west of the city and its overflow constitutes origin of another river called Pili. This river ultimately meets the river Nag.

Classification of water of Nag River Basins / Sub-Basin by Environment Department, Government of Maharashtra. Notification is reproduced below. Environment Department, Government Of Maharashtra has classified 20 main rivers & their sub basins in A- I, A-II, AIII & A-IV on their best designated use.



Table no. 01

Sr No.	Name of the River	Stretch of A-I class	A-II class	A - IV Class
1.	Nag River	---	Origin to Ambazari Lake	Ambazari Lake are Confluence with Kanhan River
2.	Pioli River	---	Origin Lake Gorewada Tank	Gorewada Tank to Confluence with Nag River

Nagpur city has a Municipal Corporation and is the Sub Capital of the State of Maharashtra. Population of Nagpur city is about 27, 00,000 as per 2001 census.

II. LITERATURE REVIEW

Saifali Sayyad, adarshdorlikar, sneharatnaparikhi, tanvibhagat (2016) conducted a detail study on “**Design and fabrication of river cleaning machine**”. In this Method River water is used for irrigation which in return gives food to the people. They also maintain the ecology of region and bring prosperity. This project is used to clean the river and control the pollution of river which is very beneficiary for our society. In this project turbine rotates by flows of river water and through the mechanical gear arrangement we arrange the conveyor belt. The conveyor belt is used to picks the solid waste from the river and collected in the collecting bin.

Ganesh khekare, uravashidhanre, Gaurav dhanre, sarikayede (2014) conducted a study on “**Design of optimized and innovative remotely machine for water surface garbage assortment**”. While conducting study the issue arises i.e. loss of machinery is too high. There are so many methods used for collection of waste floating on the river like manually, by boats, thrush skimmers etc. and are deposited to the shore of river. Hence the designing and fabrication of the remote operated river cleaning machine is proposed. The machine is consist of the collecting plate which is coupled with conveyor belt and chain drives are rotating continuously by the motor. The collecting plate is coupled between the two chain drives to collect the waste materials from river. Then the collected waste is thrown on the collecting tray. The propeller is use to give motion to the machine hence drive the machine on the river. The propeller run with help of PMDC motor. The total electrical devices are controlled by RF transmitter and receiver which use to control the machine remotely.

Tejpalparshiwani, pritamabakode (2011) conducted a detail study on “**design of automatic river cleaning machine**”. In this project “**DESIGN AND FABRICATION OF AUTOMATIC RIVER CLEANING SYSTEM**” there is a conveyor belt which is located on the front side of the boat and would be driven with the help of two rotor motors. The frame of the boat is entirely made from U-PVC pipes (of 5mm thickness) the conveyor belt is having dimensions of 1300X1000X500 (mm) (LXBXH). At the back side of the boat a tank made from plastic is used which is used to collect all the garbage collected from the water body, the dimensions of the tank could be varied as per the limitations of the length and breadth of the boat and its volume would vary accordingly. The collection bin is removable and could be removed for safe disposal of the waste in it. To run the boat a propeller is provided which would turn in either clockwise or anti-clockwise direction so as to make the boat go in forward or backward direction. The boat is going to be operated by a remote control (wired). The waste collected would then be brought back to the shore and from there the collection bin would be removed from the boat and then the waste would be collected in a garbage truck and then will be disposed off safely in the dumping yard.

Madhavi N. Wagh, KashinathMunde, (2018) conducted a detail study on “**Design and analysis of Water Cleaning Machine.**” The work has done looking at the situation of our national rivers which are dump with crore litters of sewage and loaded with pollutants, toxic materials, debris etc. automation plays an important role in mass production. In this



project they fabricated the remote operated river cleaning machine. The main aim of the project is to reduce the man power, time consumption for cleaning the river. In this project they automated the operation of river cleaning with the help of a motor and chain drive arrangement. They used RF transmitter and receiver to control the cleaning machine. Automation can be achieved through computer, hydraulics, pneumatics, robotics, etc. of these sources, pneumatics form an attractive medium for low cost automation.

Prof.Ketan V. Dhande, Abhijeet M. Ballade, Vishal S. Garde, Akash S. Lahane. (2018) conducted a detail study on “**River Cleaning Machine**”. The river cleaning machine works on hydropower to extract waste water debris, plastics and garbage from Godavari River at Nasik. In this machine the main aim of this machine is to lift the water surface and dispose them in the tray. Form that tray all the garbage collected is dropped to the conveyer belt which convey all the garbage out of the river. It is a non-convectonal river cleaning system. It’s initial and maintenance cost was low. And it is environment friendly. It was applicable to reduce water pollution in the river, ponds, and oceans.

III. METHODOLOGY OF PROPOSED SURVEY

While conducting study the issues arises i.e. cost of machinery is too high. There are so many methods used for the collection of waste floating on river or lacks manually, by using boat, thrash skimmers etc. and that deposited to the shore of rivers. These methods are risky, costly and time consuming. By considering all the parameters of river surface cleaning and eliminating the drawback of the methods used earlier, the design of the remote operated river cleaning machine which will help in river surface cleaning effectively, efficiently and eco-friendly is proposed.

Hence the designing and fabrication of “**NAG RIVER REVIVING MACHINE**” is proposed. This machine consists of collecting plate which is connected to the conveyor belt. The collecting plates are made up of **PVC** material, that when get in contact with water will not get corrode and the lifespan on collecting plates will get increase. The size of the collecting plates are considering according to the width of the river, at each corresponding section. The conveyor belt to which this collecting plates are attached will rotate continuously at a constant and suitable speed. So that all the floating material and debris present in the river will be collected by the collecting plates. These waste materials are then directly forwarded to the transferring belt. The transferring belt is placed at the downward side of conveyor belt such that all waste collected by the collecting plate drops directly on the transferring belt. This waste is then forwarded to the collecting bin which is situated just aside the whole setup at the shore. All the waste collected in the bin is then collected by **NMC** garbage truck and get deposited at their desired place and can be decomposed.

All the electricity required to operate this machine will be generated through solar plates. By providing these solar plates the electricity will also be safe.

Hence the designing and fabrication of the remote operated river cleaning machine is proposed. The machine is consisting of the collecting plate which is coupled with conveyor belt and chain drives are rotating continuously by the motor. The collecting plate is coupled between the two chain drives to collect the waste materials from river. Then the collected waste is thrown on the collecting tray. The propeller is use to give motion to the machine hence drive the machine on the river. The propeller runs with help of **PMDC** motor. The total electrical devices are controlled by **RF** transmitter and receiver which use to control the machine remotely

This whole setup is known as “**NAG RIVER REVIVING MACHINE**”. This type of 5-6 setups will be provided to 17.68 KM long **NAG RIVER** for continuous flow of waste free water in the river. By doing this method we can make our **NAG RIVER** which is today known as **NAG NAALA** again a “**NAG RIVER**” to be known. On which our Nagpur culture is based.

There will be total 06 cleaning stations at which the machine will be placed which will be operated continuously to keep **NAG RIVER** clean. Below table shows the gathered information of sewage flow, amount of solid waste, amount of floating material present and amount of impurities present at each station.



Table 1: OBSERVATION TABLE

SR NO.	Stations	sewage flow at station (lps)	No. of solid waste present at the station (kg)	amount of floating material present (%)	amount of impurities present (ppm)
01.	Station A	136	100-120	20-30	560
02.	Station B	158	150-180	20-40	674
03.	Station C	384	200-230	40-60	780
04.	Station D	432	200-250	40-70	754
05.	Station E	289	170-190	30-50	678
06.	Station F	397	140-170	20-40	864

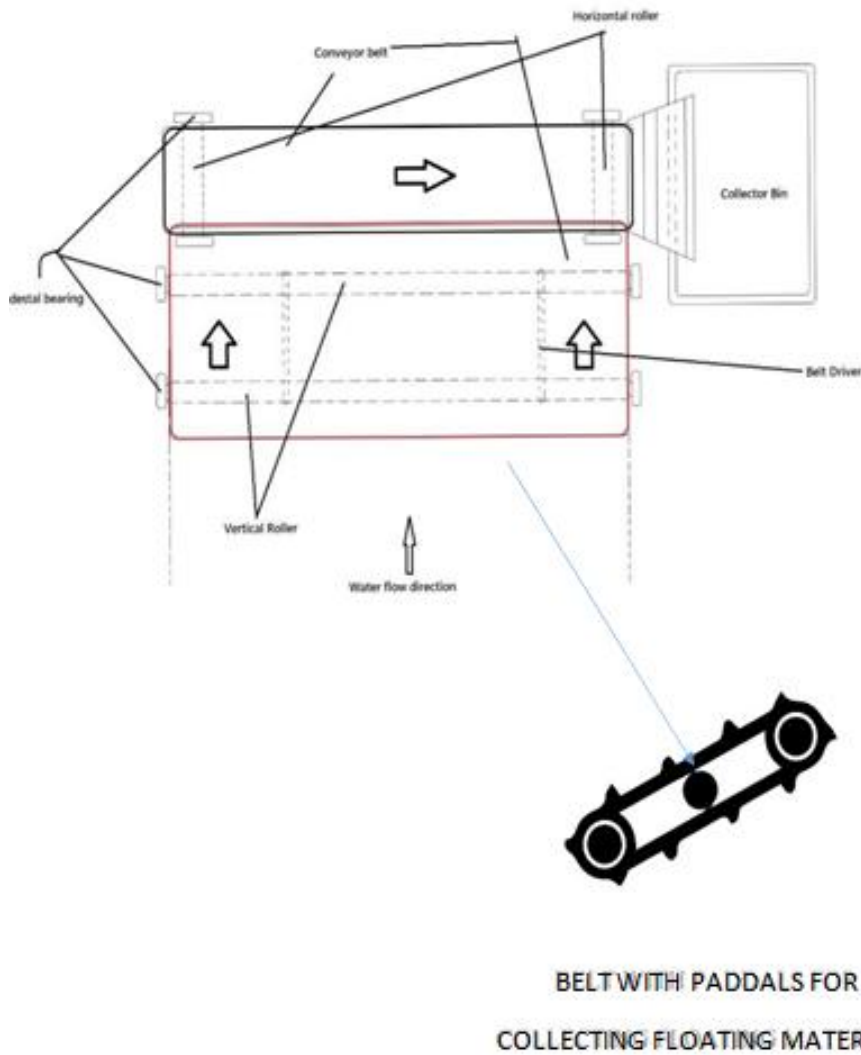


Figure 1: Overall Construction of River Cleaning Machine



IV. CONCLUSION AND FUTURE WORK

River Cleaning Machine is designed with an intention of cleaning the water debris floating on the river, by using portable lever we can collect many floating material present on the water.

In future this project can be improved to sort more categories of waste. In this system we can use advance conveyor system and conveyor material for increasing the efficiency of collection of garbage. To modify the size of machine according to its waste collecting capacity is increases. This project makes only for small lake and by doing some modification in its size and capacity it can be used in big lake and river like Ganga.

REFERENCES

- [1] Pankaj Singh Sirohi, Rahul Dev, ShubhamGautam, Vinay Kumar Singh, Saroj Kumar Review on Advance River Cleaner
- [2] Mr. P. M. Sirsat, Dr. I. A. Khan, Mr. P. V. Jadhav, Mr. P.T. Date Design and fabrication of River Waste Cleaning Machine
- [3] Prof.N.G.Jogi,AkashDambhare, KundanGolekar, AkshayGiri, Shubham Take Efficient Lake Garbage Collector by Using Pedal Operated Boat
- [4] AnkitaB.Padwal, Monica S. Tambe, Pooja S. Chavare, Reshma K. Manahawar, Mitali S. Mhatre Review Paper on Fabrication of Manually Controlled Drainage Cleaning System
- [5] OsianyNurlansa, DewiAnisaIstiqomah, and MahendraAstuSangghaPawitra, "AGATOR (Automatic Garbage Collector) as Automatic Garbage Collector Robot Model" International Journal of Future Computer and Communication, Vol. 3, No. 5, October 2014.
- [6] Prof. N.G. Jogi, AkashDambhare, KundanGolekar, AkshayGiri, Shubham Take, "Efficient Lake Garbage Collector By Using Pedal Operated Boat", IJRTER Volume 02, Issue 04; April 2016 ISSN: 2455-1457.
- [7] M. Mohamed Idhris, M. Elamparathi, C. Manoj Kumar Dr.N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arunkumar, DESIGN AND FABRICATION OF REMOTE CONTROLLED SEWAGE CLEANING MACHINE.



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor:
5.928

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY



9710 583 466



9710 583 466



ijmrset@gmail.com

www.ijmrset.com