

## **DESIGN AND FABRICATION OF MOTORIZED SINTEX WATER TANK CLEANING INSTRUMENT (1000 LITRES)**

Harish Mudegonnavar<sup>1\*</sup>, Neelakanthareddy Y B<sup>2</sup>, Siddesh N Bevinahalli<sup>3</sup>

<sup>1</sup> Harish Mudegonnavar Mechanical Engineering, R. T. E. Society's Rural Engineering College Hulkoti, Gadag, Karnataka, India-582205 ([harishsm.mech@gmail.com](mailto:harishsm.mech@gmail.com))

<sup>2</sup> Neelakanthareddy Y B, Mechanical Engineering, R. T. E. Society's Rural Engineering College Hulkoti, Gadag, Karnataka, India-582205

<sup>3</sup> Siddesh N Bevinahalli, Mechanical Engineering, R. T. E. Society's Rural Engineering College Hulkoti, Gadag, Karnataka, India-582205

### **ABSTRACT**

Water tanks are usually left alone, they are not cleaned on a regular basis and the effect of this is recurring illness from water borne diseases such as diarrhoea, amoebiasis, cryptosporidiosis, giardiasis, and other gastrointestinal diseases caused by swallowing contaminated water. It is already uncomfortable to get into the sintex tank and clean it. Hence, we have come up with a customized design of a motorized sintex cleaner that will reduce the human effort and will efficiently clean the sintex.

Hard brushes are used in this cleaner which will clean the walls and bottom of the sintex water tank effectively. The purpose of this project is to reduce the human efforts and to avoid the chemical influence on health of person entering the tank for cleaning. In this modern world, cleaning of overhead tanks manually is a tedious job. To overcome this, we have aimed at tackling the disadvantages of cleaning overhead tanks, so an automatic system overhead tank cleaning is designed to provide high safety, high efficiency, less time for cleaning and to avoid environmental pollution problems.

The water tank cleaner is used to clean the water tanks by using rotating brushes. This method will be more effective and safer than the conventional methods. This method is capable to clean water tanks within less time and human efforts advanced model for tank cleaning system is cleaning the tanks thus making the operation user friendly.

The future scope of the project is to extend it with auto feeding mechanism by which the manpower involved in feeding gets removed.

### **INTRODUCTION**

Water is one of those natural resources, which is essential to every human being for many purposes, especially for drinking. We already know that earth is composed of water (three-fourth of the earth), but the entire three fourth isn't fresh water. Therefore, it is our duty to

save water, keep the fresh water as fresher as possible, and to keep it free from water pollutants. The water that's pumped to our home is undoubtedly clean, but is the place where it gets stored clean as well? Yes, we are talking about the overhead water tanks. The health of your water largely depends on how clean your water tank is. Hence, cleaning overhead water tank is very necessary.

Every day we use the tank water for brushing and bathing, for cleaning and mopping, for washing clothes and in other household chores. With the passage of time, sediments scale and algae get deposited on the walls, ceiling, and floor of the water tank. This can eventually clog pipes. Hence water tank cleaning is very important. Manual Cleaning water tank method is the traditional method of cleaning the water tank where a labour would get into tank and scrub the wall. The water tank can also be cleaned by using chemicals to remove the dirt and sediments. The chemicals used may affect the human health. Pressurized water can be sprayed on the walls of the tank which will remove the dirt from the tank surface.

These methods are time consuming and require more efforts for cleaning. Tank cleaning is extremely hazardous activity. When working in confined space personnel are exposed to several hazards that in some cases have led to injury or even death. There is various definition of a 'confined space' through are consistently applied. "a place which does not have benefit of natural ventilation" and, "a place which difficult to enter therefore present hindrance to rapid escape in case of an emergency." Cleaning overhead water tank on your own may be difficult because you need different types of tools, equipment and most importantly the time. But overhead water tank cleaning is important too and it must be cleaned at least once or twice a year.

## **METHODOLOGY**

This is a design for machine that can clean the overhead storage tank within several minutes effectively. It consists of a frame made of mild steel which sits on top of the tank neck concentrically, a support rib is made at the centre of the frame, a vertical slot in the block is made in which the rack is made to translate in vertical direction (y-axis).

A brush holder is fitted at the bottom portion of the rack where two brushes are mounted on its lateral surface and a custom-made flexible brush is fixed directly below the holder. This brush is made from materials like sponge, foam, and bristle sheet. A small motor is also mounted at end of rack where a spur gear set is used to rotate the brushes which will clean the walls of the tank.

The rack and the brush holder are connected through a joint. This joint has two bearing which are used to impart smooth rotational motion, both of the parts are held at the joint with a key at each end refer fig.3.1.

The whole rotating mechanism is made to go down steadily using the rack and pinion arrangement. And once it reaches the bottom of the tank it cleans the bottom part in 5-10 rotations. At the end a suction pipe is used to suck out all the muddy water that is present at the bottom of the tank.

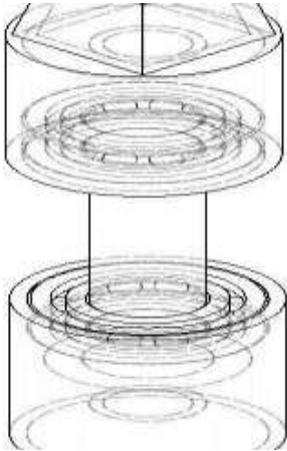


Figure: - joint

## **DESIGN**

Assembled view of the machine



Fig. : Assembled view of the machine

## **APPLICATIONS**

The machine developed here is for a specific task i.e. to clean a 1000 liters water tank.

## CONCLUSION

The water tank cleaner was used to clean the water tanks by using rotating brushes. This method was more effective and safer than the conventional methods. This method is capable to clean water tanks within less time and human efforts. For cleaning the tank, we need one worker which take more time as well as water. As we know, now a day's wastage of water is a great issue. To resolve these issues, we made this machine at great priority.

- The water tank cleaner will be used to clean the water tanks by using rotating brushes. This method will be more effective and safer than the conventional methods
- This method is capable to clean water tanks within less time and human efforts, thus making the operation user friendly.
- The working prototype is promising in terms of imparting cleanliness.

## REFERENCES

- [1] <https://www.ngwa.org/what-is-groundwater/About-groundwater/information-on-earths-water>
- [2] Shubham Shrivastav, Hari Om Kumar, "Design and Development of Cylindrical Water tank cleaner" *Int. j. emer. technol. adv. Eng. (IJETAE), Volume 6, Issue 1, January 2016.*
- [3] Thonge Suraj D, Shelke Prasad K, Wakte Vaibhav B, Thonge Sharad A, Prof. Shinde R.S "Automatic Water Tank Cleaning Machine", *Int. res. j. eng. Techno;. (IRJET), pp1674-1676 Volume: 04 Issue: 02 Feb -2017.*
- [4] Mr. Yogesh K. Chaudhari, Mr. Nitesh B. Patil, Mr. Sachine A. Khangal, Mr. Nisar S. Shaikh, Mr. Shrikant U.Nagare "Design & Fabrication of Water Tank Cleaning Machine" *Int. j. res. appl. sci. eng. technol. (IJRASET), pp278-282 Volume 6 Issue V, May 2018.*
- [5] Rohit R. Dabhade, Shubham V. Lasankute, Sanket P. Wankhade, Shubham G. Darokar, Prof. Vikramsingh R. Parihar, "Automatic Overhead Water Tank Cleaning System: A Review and an Approach", *Int. j. adv. res. sci. eng. technol. (IJAERS), pp- 185-194, Vol-5, Issue-10, Oct- 2018.*
- [6] J.B.K Das and P.L.Srinivasanmurthy, "Design of machine elements-2", Sapna Book House (P) Ltd, (2012).
- [7] Bhandari, V.B., 2018, "Engineering Materials", Design of Machine elements 4/e, McGraw Hill Education (India) Private Limited, Chennai, pp 19-50.
- [8] Bhandari, V.B., 2018, "Spur Gears", Design of Machine elements 4/e, McGraw Hill Education (India) Private Limited, Chennai, pp 634-676.