

# AUTOMATIC TANK CLEANER

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**ABSTRACT :** In order to overcome the problem related to over head tank cleaning , we designed an automatic system overhead tank cleaning system to provide high safety, high efficiency, less cleaning time and avoid environmental pollution problems. The main purpose of the project is to develop a mechanical system for cleaning cylindrical water tanks in households. The mechanical system consists of two main mechanisms, namely the rack and pinion mechanism and the reciprocating four-bar linkage mechanism. The rack is fixed on the motor, and the four-bar linkage is installed on the motor shaft. The PVC brush is connected to the end of the four-bar linkage. The four-bar linkage mechanism is made in such a way that it can be adjusted according to the inner diameter of the tank. After the motor is started, the linkage device rotates and cleans the wall and bottom of the box with the help of a brush. The purpose of this project is to reduce the workload of personnel and prevent chemicals from affecting the health of personnel entering the cleaning tank.

**Key Word:** Tank cleaning , Motor shaft , PVC brush , Water tank.

## 1. INTRODUCTION

Water tanks are utilized to provide storage of water for use in numerous applications, drinking water, irrigation agriculture, fire suppression, agricultural farming, both for plants and livestock, chemical manufacturing, food preparation as well as numerous other uses. Water tank boundaries incorporate the overall plan of the tank, and decision of development materials, linings. Different materials are utilized for making a water tank Earthen pots, such as matki used in South Asia, can likewise be utilized for water stockpiling. Water tanks are an effective method to assist agricultural nations with putting away clean water. Water tanks are utilized to provide storage of water for use in numerous applications, drinking water, irrigation agriculture, fire suppression, agricultural farming, both for plants and livestock, chemical manufacturing, food preparation as well as numerous other uses.

The following types of tank was used

- 1. Chemical Contact Tank :** The FDA and NSF polyethylene construction, allows for retention time for chemical treatment chemicals to “contact” (chemically treat) with product water. The tanka is used in Rajasthan as a traditional form of rainwater harvesting
- 2. Ground Water Tank :** Made of lined carbon steel, may receive water from a water well or from surface water, allowing a large volume of water to be placed in inventory and used during peak demand cycles.
- 3. Elevated Water Tank :** It also known as a water tower will create a pressure at the ground-level outlet of 1 kPa per 10.2 cm or 1 psi per 2.31 feet of elevation. Thus a tank elevated to 20 meters creates about 200 kPa and a tank elevated to 70 feet creates about 30 psi of discharge pressure, sufficient for most domestic and industrial requirements.
- 4. Vertical Dome Tank :** The top tanks may hold from 200 litres or fifty gallons to several million gallons. Horizontal cylindrical tanks are typically used for transport because their low-profile creates a low center of gravity helping to maintain equilibrium for the transport vehicle, trailer or truck.
- 5. Hydro tank :** It is typically a horizontal pressurized storage tank. Pressurizing this reservoir of water creates a surge free delivery of stored water into the distribution system.

## 2. LITRATURE REVIEW

The emphasis is on the concepts used by the concerned authors, the database used for experimentations and the performance evaluation parameters. Their claims are also highlighted.

Table 01

Sr. No.	Ref. no. Concerned Author(s) and years	Concept used	Claimed by concern authors	Findings
1	S. Abhishek, D. Kiran, P. Praveen and Dr. K. L. Senthilkumar (2017)	A mechanical system which clean the tank mechanically using brush, rack and pinion , bar Linkage and motor.	The authors observed that the Cleaning is done more effective than the Conventional methods.	Cleaning of the tank using this system is not Effective.
2	Brown J. A (1989)	vacuum tanker for cleaning storage tanks which is an vaccine cleaning system for cleaning the water tank and also acts as a water pump to force water.	Powerful technology to clean Big water tank more efficient and in very less time.	Very expensive
3	Prayosha innovative (2017)	Sedimclean water tank cleaning machine which clean sediments in the tank. It is a vacuum cleaner type system which clean the tank without removing the water from the tank.	Sedimclean water tank cleaning machine which Clean sediments in the tank. It is a vacuum cleaner type system which clean the tank without removing the water from the tank.	Only clean the sediments in the tank not the scale And algae inside the tank.
4	M.S.Triantafillou and G. S. Triantafyllou, (2003)	An efficient swimming vehicle is a mechanical system to clean the swimming pool using	Fish-like underwater micro robot which clean the swimming pool effectively.	Good working
5	W. S. N. Trimmer and K. J. Gabriel (1987)	Design considerations for a practical electrostatic micro-motor	A high torque less speed motor of very small in size.	Good perform Ance

### 3.COMPONENTS AND MATERIAL USED

The following components is used

**1. Low Speed High Torque Dc Motors,** Gear motor is used to produce high torque with low speed. motor used has specifications as single phase which produces power of 0.15 HP and frequency of 50Hz and the shaft speed is 30 rpm. We have two DC motors, one for translation motion and another for rotational motion. Both motors have independent control for each purpose.

## 2. Water tank

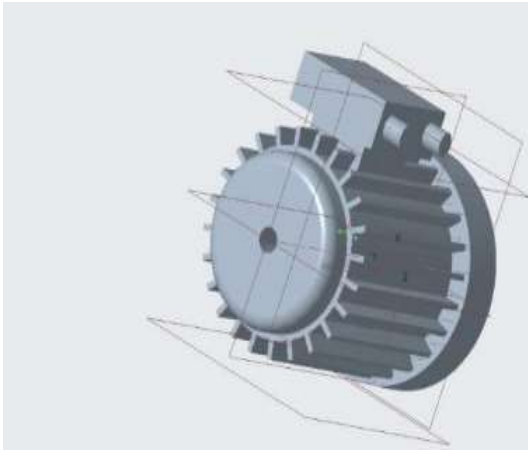


Figure 01 Motor

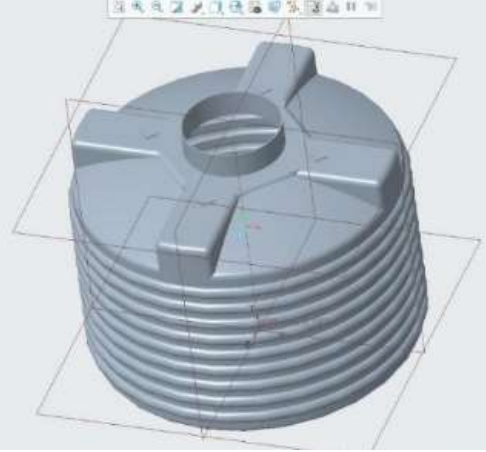


Figure 02 Cross section of tank

Water tanks are utilized to give stockpiling of water to use in numerous applications, drinking water, water system horticulture, fire concealment, rural cultivating, both for plants and domesticated animals, compound assembling, food arrangement just as numerous different employments

### 3. Hollow Shaft

**4. Brushes connecting with shaft :** 'The brushes are comprised of Poly Vinyl Chloride polymer. Brushes connected to the finishes of four bar linkage spin because of revolution of engine shaft to clean the internal surface of the tank.

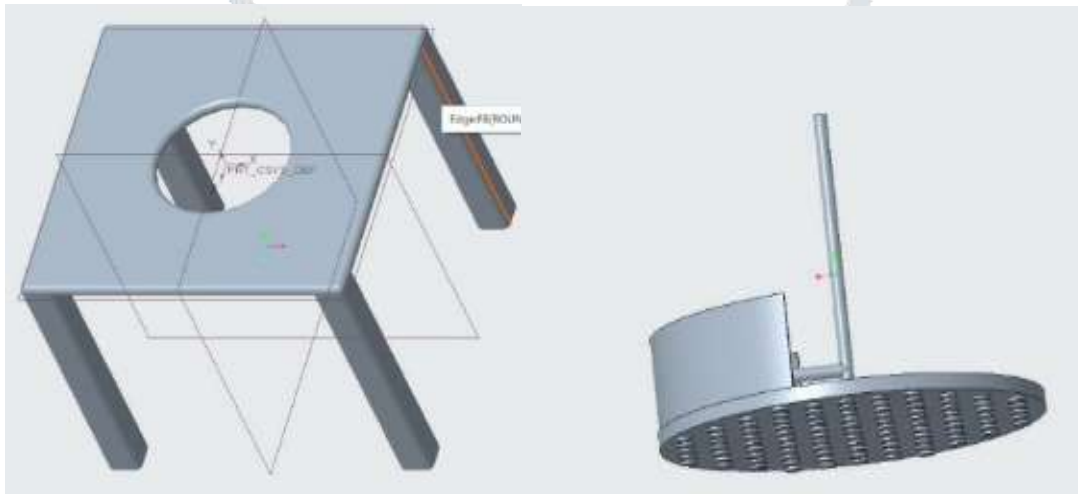
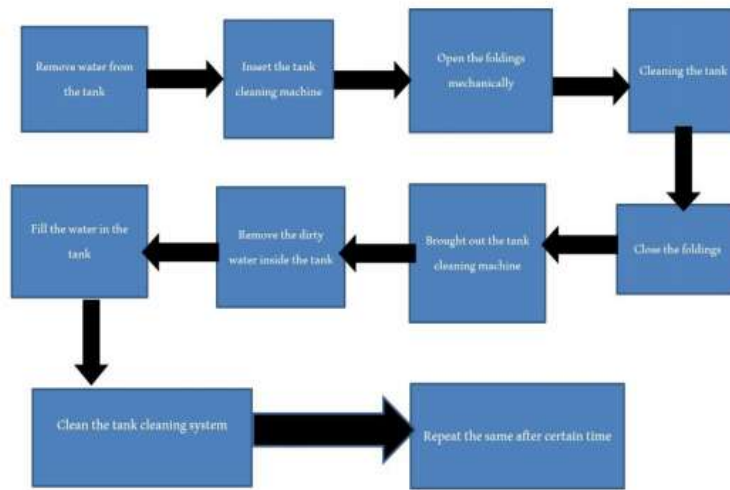


Figure 03 Details of supporting base

Figure 04 Arrangement of brush

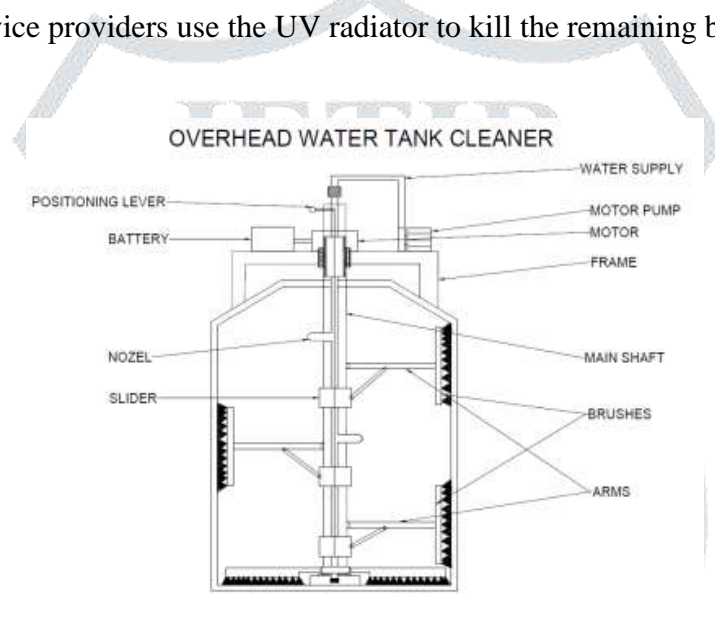
## 4. METHDOLOGY

Automatic cleaning of the water tank saves time and money. If we are cleaning your tanks manually or using the fill and empty method, you may be surprised at how much you can save through automation. Automated tank cleaning is best suited for apartment complexes and businesses or buildings installed with large water tanks. Nowadays, professionals and companies working with automatic tank cleaning equipment arrive at their doors with their equipment to clean the water tanks in a few hours. The advantage of automated tank cleaning equipment is that it saves you time.



**Flow chart of details activity**

After cleaning the water tank, the water tank is disinfected using chlorine or antibacterial agents. Some professional cleaning service providers use the UV radiator to kill the remaining bacteria.



**Figure 05 Block diagram of overhead automatic tank cleaner**

### 5. RESULT AND DISCUSSION

The machine is connected at the top of the tank. At that point the brushes are mounted at the three end of the shaft through a surface of the tank. A Micro controller and display show Timer is utilized to set the number of pivot seasons of brushes and development of shaft. After the total arrangement, the engine turns and the brushes turn at the outside of the tank. A spring pressure is instrument is connected between the brush what's more, shaft. At last the water gets channel by the power source of the tank.

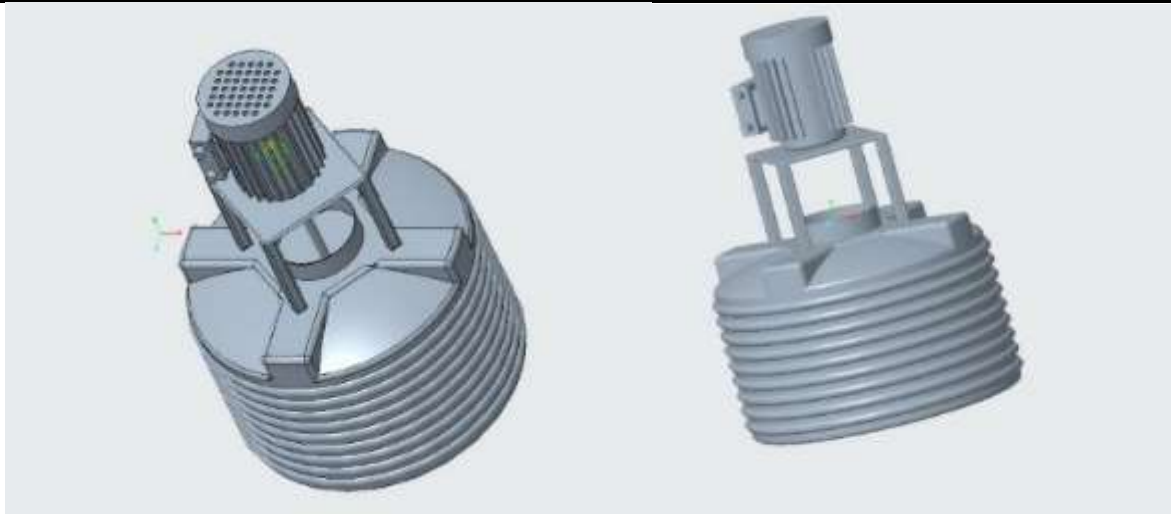


Figure 06 Working model with detail components

## 6. ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of the project would be in completed without the mention of the people who made it possible, without whose constant guidance and encouragement would have made effort go in win. We consider our-self privileged to express gratitude and respect towards all those who guided through the completion of the project.

## 7. CONCLUSION

The water tank cleaner was utilized to clean the water tanks by utilizing turning brushes. This strategy was more compelling and more secure than the regular strategies. This technique is able to clean water tanks from inside with less time and human endeavors progressed model for tank cleaning framework is cleaning the tanks in this manner making the activity easy to use. The working model is promising both regarding granting neatness and staying away from abundance labor.

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