

Design & Fabrication of Semi Automatic Water Tank Cleaning Technique:- A Novel Approach

Viral Pandya¹, Kishor Chaudhary², Vikas Yadav², Saurav Gajera², Keval Wadhvana²

^{1,2}Dept of Mechanical Engineering

^{1,2} Amiraj Collage of Engineering And Technology

Abstract- Aim of this project is to develop a mechanical system for cleaning domestic cylindrical water tank. The mechanical system include main mechanisam which is rotating mechanisam with rigid structure. This machine have easy control for recurred moments. When the motor is started then shaft started rotating and with the help of brushes cleaning of wall and base of the tank. Implementation of process using most effective and cost effective method is also an important concern in project.

Keywords- 1) Toggle Switch, 2) PVC Brush, 3) Hollow Pipe,4) Water Pump, 5) DC 12v Motor, 6) MS Plate Clamp,7) Plastic Coupling 8) Wooden Block, 9) Switch Board, 10) Cylindrical Water Tank, 11) Switch Board

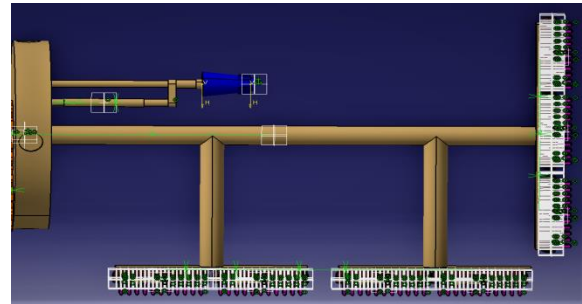
I. INTRODUCTION

The purpose of design and fabrication of automatic water tank cleaning machine it reduce the human effort and avoid chemical influence on the health of person entering the water tank for cleaning. When the motor is start linkage rotating and with the help of cleaning of wall and base of tank place. Every day we use the tank water for brushing, abating for cleaning and moping for washing clothes and in other house hold chores. With the passage of time sediments and scales and algae gets deposited on the wall, ceiling and the floor of the water tank. This depositing contaminates the water and makes is unfit for use. With time algae and bacteria grow and breed in this water and infect it and could make us fall sick eventually. Hence water tank cleaning is very important.

II. WORING PRINCIPLE

- Firstly whole water is removed from the tank
- Detergent is then sprayed on inner wall of the tank for easy removal of dirt.
- The whole system is insert in retracted position into the tank.
- The four bar linkage is then adjusted according to the tank diameter in such way that brush at the end if the shaft touches the bottom of tank.
- Now motor is switched ON.

- The four bar linkage starts rotating along with the shaft.
- The causes scrubbing of inner wall of the tank by the brush attached to the ends of the linkage.For cleaning upper portion of the tank the whole mechanisam is the rotated with help of the motor.And nozzle cleaning the dust.
- In this way the tank gets cleaned within minimum time



Cad Model



Top View



Front View

III. MAIN COMPONENTS PROJECT

1. **12V-DC MOTOR**:- 12V Motor which operates at 60 rpm, are connected to the hollow pipe and through coupling are connected to the coupling and connected to the brush and motor are rotating and with attach PVC brush end of shaft through cleaning water tank wall.
2. **HOLLOW SHAFT (PVC PIPE)**:- Shaft are made up of PVC of diameter 12.7 mm is used transmit rotary motion from motor to the hollow PVC pipe and adjust according to the diameter of the tank. In the hollow shaft , the material at the center is removed and spread at large radius. Therefore , hollow shafts are stronger than solid shaft having the same weight. The stiffness of the hollow shaft is more than the solid shaft with the same weight. The hollow shaft is costlier than a solid shaft.
3. **BRUSH**:- A brush is a common tool with bristles, wire or other filaments. It generally consists of a handle or block to which filaments are affixed in either a parallel or perpendicular orientation , depending on the way the brush is to gripped during use. It is use for cleaning , grooming hair , makeup, painting, and surface finishing and for many other purposes. It is one of the most basic versatile tools in use today. The brushes are made up Poly Vinyl Chloride (PVC) polymer. Brushes attached to the ends of hollow pipe revolve due to rotation of the motor shaft to clean the inner surface of the tank.
4. **SPRAY NOZZLE**:- A spray nozzle is a device that facilitates dispersion of liquid into a spray. Nozzle are used for the three purposes: to distribute a liquid over an area , to increase liquid surface area, and create impact force on solid surface . a wide variety of spray nozzle application use a number of spray. Spray nozzle can be categorized based on the energy input used to cause atomization, the breakup of the fluid into drops. Spray nozzles can have one or more outlets; a multiple outlet nozzle is known as a compound nozzle. Spray nozzle range from heavy duty industrial uses to light duty spray cans.
5. **RIGID STRUCTURE**:- It is made of wooden and it is provided support form the shaft and motor for easy to cleaning surface of the water tank.

IV. SCOPE AND OBJECTIVE

1. Flexibility In Power Source:- The design should be able to utilize a variety of power sources , including solar, AC it will be use.
2. Maximize Efficiency:- The design should maximize the area of water tank cleaning.

3. Minimize Cost:- The design should minimize using various applied methods based on the cleaning methods and materials.

V. FUTURE SCOPE

This system is user friendly and saving also the cost is less hence it can be used in future water tank cleaning. In future the advance system may also be invited like vacuum cleaner type system that can be clean the tank without removing the water from the tank. The system could be more compact and light weighted and more user friendly and efficient by improvement in the design and using some other advance equipment. To add a system when tank is overflow alert is sent to user.

VI. CONCLUSION

The water tank cleaner was used to clean by using rotating shaft with attach end of brush.

This method is more effective and safer than the convention method.

VII. ACKNOWLEDGMENT

We are very thankful to Amiraj college of engineering & technology for providing us technical mentoring during research work .

REFERENCES

- [1] Dr. R.K. Bansal “ kinematics of machine” , Laxmi publications(P) Ltd.,vol.1 no.4, pp.23-287, Nov,2011
- [2] R.S. KHURMI & J.K. GUPTA “Machine Design”.
- [3] PSG College of Technology “ Design data book”.
- [4] “Theory of machines” , R.S.KHURMI & J.K. GUPTA.
- [5] S S Rao, Mechanical Vibrations, Pearson.