

BOTTLE CLEANING MACHINE

S.Murugesan¹, S.Arunkumar², M.Gokulram³, M.Logapriyan⁴, V.Prasanth⁵

¹Assistant Professor, ^{2,3,4,5}Final Year Students

^{1,2,3,4,5}Department of Mechanical Engineering, Sengunthar Engineering College, (Autonomous),
Tiruchengode, Namakkal Dist., Tamilnadu - 637205.

ABSTRACT

This project “Automatic Bottle Washing Machine” deals with the cleaning of bottles used for packing soft drinks. This project will be quite useful when implemented in soft drinks manufacturing companies as bottles are collected and reused for packing. Recently the Cleanliness of these bottles had brought in a quality problem which leads to the reduction in sales for these soft drinks. Hence such a project which automates the cleaning of bottles might be of some help provided the water used for purpose is frequently changed and checked. This project deals with the fabrication of a simple model of the unit, which uses pneumatic components which are controlled by a Solenoid valve and Control Timing Unit.

Keywords-Bottle Cleaning Machine, RGB (Returnable Glass Bottle), SSR (Solid State Relay), Washing Compound

I. INTRODUCTION

In beverage filling and packaging industry, various types of machines are used to carry out the beverage filling and packaging process. However, some variation in terms of machines is possible depending upon the type of container used to carry the beverage in the beverage filling and packaging line. Mainly, three types of containers are used to carry the beverage: (1) RGB (Returnable Glass Bottle), (2) PET (Polyethylene terephthalate) bottle, and (3) Can.

The bottle washer machine is a prominent part of the bottle filling and packaging line and it is used in the beginning of the bottle filling and packaging line. The bottle washer machine is mainly used to clean the used bottles in case of RGBs and it is used to rinse the bottles in case of PET bottles before the beverage filling and packaging is carried out. The functionalities of the bottle washer machine will be different based on the type of beverage container used. The used RGBs need to be cleaned before beverage filling and packaging is carried out since used bottles may contain dust,

sand, beverage residues, rain water, mineral stains and microbes.

The project proposes to undertake bottle washing process in an automated bottling plant. Both automated and manual operations are possible in the process. The manual operation, the Hand operated Direction Control Valve is Used. The automation process is done through a Solenoid Valve and Control Timing Unit. The project is an electro pneumatic project with an interconnection of pneumatic parts and electronics.

II. LITERATURE SURVEY

In small scale industries the bottle are washed in the hands so the manpower, money and time are waste to overcome the issues the bottle cleaning machine was created and reduce the size of the machine for small industries as compared to large scale industries.

Paper [1] Temperature is the most critical parameter to ensure the proper cleaning of beverage containers in bottle washer machine. The requirement and importance of temperature control

of different treatment zones of bottle washer machine for small scale beverage industry has been discussed. The sample water heating tank has been considered as the treatment zone of the bottle washer machine. The temperature control of the sample water heating tank with VIPA 315-SB PLC using PID control has been discussed and implemented. Two tuning methods for PID control, namely Ziegler Nichols tuning and auto-tuning have been discussed and implemented. The novel approach for implementation of MPC using OPC server and MATLAB as an OPC client has been discussed and implemented for sample water heating tank system.

Paper [2] this paper proposes the design and automation of the economical bottle washer machine for the small scale beverage industry without compromising its control capabilities. The importance and requirement of the bottle washer machine in the beverage industry has been discussed. The design of the proposed bottle washer machine for RGBs (Returnable Glass Bottles) has been created in the Creo software. The different treatment zones and working of the bottle washer machine has been discussed. The bottle washer machine has been automatized using the Siemens S7-317-2-PN/DP PLC (Programmable Logic Controller) and programmed using a ladder diagram in the SIMATIC Manager. The level control for different treatment zones is achieved by means of limit switches and temperature control for different treatment zones is achieved by using Pt1000 RTD, SSR (Solid State Relay) and heater.

Paper [3] the enhanced mechatronics system design is based on concurrent Engineering. This process is all about building a machine in virtual environment before constructing in actual hardware. Here we can detect fault at earlier stage by creating animation and emulating it in virtual environment. If we follow the conventional process there is high

chance to get faulty result and also have to spend more time and money to finish the project whereas by using concurrent engineering it is more useful to develop the project in more efficient and cost effective way

Paper [4] in this paper NaOH and such chemicals are used to clean the returnable glass bottles to reuse in beverage packing of glass bottles to reuse in the industries. The machine subjected to two different speeds, 40,000 bottles per hour (BPH) and 46,000 BPH. In this machine we processing the bottle at high speed.

III. METHODOLOGY

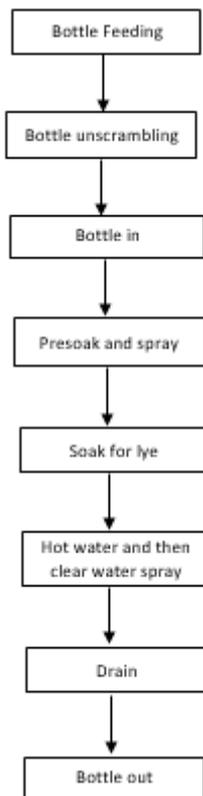
The bottle is moving on the conveyor when it is near to the brush, Ultra sonic sensor detects the bottle and send a signal to microcontroller. Then microcontroller stop the conveyor and send a signal to solenoid valve to actuate the pneumatic cylinder, then the brush and pipe line comes down the microcontroller actuate the pump to spray the water then water is sprayed into the bottle for some seconds after the spraying of water, motor is actuated by the controller then brush is rotated at some speed and time after the brushing the solenoid valve again actuated by the controller to move upside and the controller actuate the conveyor for the next process. This loop process is continuously working in the machine.

The machine working under the controller of ATMEGA328P processor. The micro controller control the all the systems in the machine. So the machine processing the cleaning process automatically so we save the man power, time and money.



Fig 3.1

IV. BLOCK DIAGRAM



V. CONCLUSION

In this project the bottle was washing with very hygienically in this machine and it is a fast working machine compared to older devices. The machine is reduce the manpower, time and money. The testing of the machine concluded the operational procedures of the machines affects the efficiency and practicability. The project is a very compact

device compared to other bottle cleaning devices or machines so it occupies very less space it can be easily movable to any places. In next level project the chemicals bottles are washed with highly efficient way with the help of chemicals to returnable glass bottles and reuse the bottles so it can reduce destruction of bottles.

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