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Automatic Bike Washer Design and Manufacturing

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Abstract- The paper consists brief information of the product; devolpment of automatic two-wheeler washing machine. This machine includes a fixed frame, movable frame, nozzles, guide rail mechanism, motor, pressure pumps, drive system. The guide rail mechanism includes gears for power transmission and motor to drive the mechanism. Power transmission through gears drive the guide rail mechanism. For cleaning the bike, the pipe frame with fix nozzles welded over it moves to and fro, this system is driven by motor. The vehicle which is being washed is placed on the ramp on the main stand of the vehicle so that there is no need of any external support. Thus, pressurize water is passed through the pipes and is sprayed over the motorcycle passing through nozzles. The tag line on basis of which we have started working on the project is 'machine for common man' looking at the prices of automatic machines in the market The portability of the product ensures an entrepreneurial development of an individual by setting a business. Key feature of the product is that it has been made for cost effective purpose.

Keywords: cost effective, nozzles, washing center, linear guide wheels

I. INTRODUCTION

Hand wash is most effective washing for a two-wheeler as labour can have access over the parts which cannot be cleaned by automatic machine, but certain drawbacks are seen such as, it is time consuming, number of labours required is more, health issues of labour mostly skin related problems, wastage of water, etc. todays world is looking forward for automatin in each litte thing and people want everything to be done within seconds without wasting much time & for which automation is the key to save time. Our product the automatic bike washing machine is a system that sprays foam over and under the two-wheeler portions and then a cycle of high-pressure water spray runs over for cleaning. The main purpose is to obtain the washing of the bike automatically within few minutes and safety.

Goals

Goals of this system is to minimize the labour work and washing time of two-wheeler. Getting your motorcycle cleaned is not an easy task. Whether we decide to do it ourselfs or get it washed at washing centre, each option comes with its own set of problem. If washing of motorcycle is done on our own, we need to have an electrically powered high pressured washer. Although quite a few options are available in the market, they retail from around Rs 15000 which does make them expensive. Such products require they both an electrical and a water connection to function. Also being a high-pressure unit, one must operate with almost care and precaution. And if we visit a washing centre, one will have to wait for his turn but also supervise the entire process so that the hard-to-reach spot are clean properly. Either way it those processes will take at least 45 min. in order to complete the wash and additionally, a substantial quantity of precious water will also be consumed. So, we have different method of getting a motorcycle cleaned and washed.

II. LITERATURE REVIEW

Design Optimization of Bike Washing Plant

(Sagar Khatavkar1, Vikas Wankhade2, Vikas Pujari3, Mrunali Jadhav4, Abhijeet Suryawanshi5), the paper was published on October-2019, they concluded that Automatic bike washing system makes cleansing of bike easier. The water motor, shampoo motor and gear train are automatically controlled by the microcontroller Arduino Uno. Relays and contactors were used for switching motors and gear train automatically with the help of electrical signal from microcontroller. The time required for the cleansing of bike is less than conventional method. The manpower is also reduced to greater extent. Almost all of the water can be recycled. Improving the economy of the system in the future such system will have more demand.

Automatic Hybrid Machine for Bike and Car Wash

(Rahul Ralebhat, Rupesh Kumar Chhugani, Shubham Padalkar, Abhishek Patne), the paper was published in june 2019, they concluded that using hybrid automatic machine for car and bike wash. The product is technically sound, financially

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viable, operationally feasible, environmentally friendly and of great usability. Future work can be done to make tailor made applications for various vehicles.

Automatic Washing for Two-Wheeler
(Jagdish Vaishnav, UdheshKapadnis, Akshaykasbe, Saket Kachhawa, Prof.SagarAswar). They published a paper in which they developed a prototype for bike washing plant which was fixed. providing a unique system which is robust enough to automatic washing of two wheelers within 2 minutes. This prototype will help to perform Bike washing automatically results in high quality product. Thus, it will be User-friendly and capable to wash multiple bikes at a time. Also require less manpower, time, and no pollution. The washing bay has a few oscillating nozzles for spraying water under the chassis and over the body of motorcycle.

RFID-GSM Autonomous Car Washing System
(K. Vidyasagar, R. Ram Prasad) The product was way expensive than it has be for day to day use it can be used for luxurious car wash. The developed concept is implemented on prototype working model to test various car washing conditions. The results obtained enabled us to implement the same concept for real time applications. So that, by implementing the proposed mechanism improper washing of the car with manual operation may be eliminated. Considerable time is also reduced to complete the operation. In future fuzzy logic concepts proposed to be implemented using ARM processors.

III.DESIGN

After reviewing the research paper mentioned above, we have realized that the designing of an automated bike washer machine is complicated. We intend to design and optimize a structure that is compact, efficient and easy to maintain. Automatic bike washer only allows washing of two wheelers. The system consists of metal frame, motor to drive the mechanism, nozzles, soap liquid storage tank, high pressure pump, GI pipes, relay and contactor, timers, ramp. A high-pressure pump is attached to pump the water at a high pressure through nozzles so that it could clean the vehicle easily.

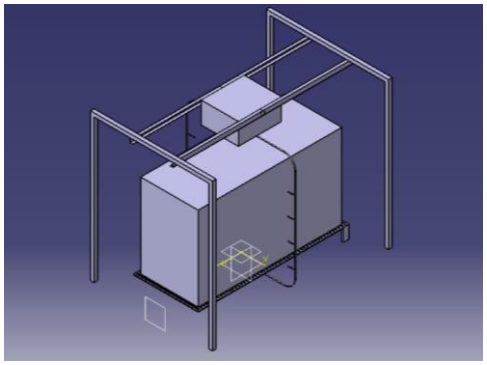

Fig. 1 Design

Design consideration:
Sq. Section of Mild Steel is to be use.
Dimensions are: 2*1.6*2.4 m

IV.STRESS ANALYSIS

Design consideration:

- **Stress Analysis-**
- Force- 200 lbs
- Channel size- 40*40 mm
- Material- Mild Steel

- **Pressure analysis-**
- Pressure- 195 Bar
- Water Flow Rate- 420 L/h
- Pipe diameter- 40mm

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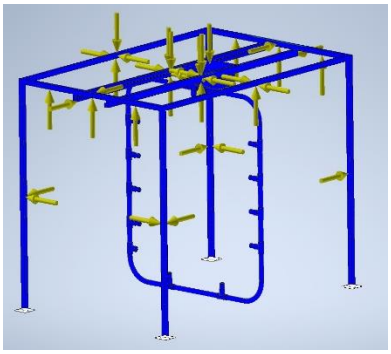

Fig. 2 Stress Analysis

V.COMPONENTS

Fig. 3. Nozzle

1. **Nozzles-**Nozzle used for this application is of 25 deg. and 40 deg. A spray nozzle is precision devise that facilitates dispersion of liquid into a high-pressure spray. Nozzles are used for three purpose they are as follows:

- to distribute a liquid over an area
- to increase liquid surface area
- create impact force on a solid surface

.

Fig. 4 Commercial Pressure Pump

2. **Commercial Pressure Pump-** Generally, this pump is a pressure booster pump, which can be used to raise the water pressure. The impeller works like a vane that rotates on an axis that pulls water inside. Water pressure generated 18-20bar.

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Fig. 5. ½ hp motor

3. **½ hp motor-** A ½ hp motor will be fixed over the frame. This motor will transmit power to gears in mesh and thus it will drive the rail guide mechanism. An Ac motor is an electric motor driven by an alternating current. Steel pipes.

VI. OBJECTIVE

- Benefits
- Reduces Time, Efforts & Manpower & Cost
- Easy To Operate.
- High Quality Wash
- Manual system is converted by automatic system. item High pressurize water is used to clean the vehicle.
- Pipe movement mechanism plays an important role to cover both RHS and LHS sides of bike.
- Frame Provides well support to the whole system.

VII.CONCLUSION

Here we are providing a unique system which is robust enough to automatic washing of two-wheeler within few minutes. This prototype will help to perform bike washing automatically results in high quality product. Thus, it will be User-friendly and capable to wash multiple bikes at a time. Also require less manpower, time, and wastage of water will be reduced.

By implementing this project, we are trying to reduce the cost of automatic bike washer machine. As it is already in markets at a high price which is quite expensive for Indian markets.

This system can also be used for Car Wash Cleanser with additional modification in width and height of the nozzle frame. The washings process just takes only 1 min to complete. In general, existing bike washing technologies takes more than 2 minutes to wash a bike.

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