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DESIGN AND FABRICATION OF COOLANT MIXING SYSTEM

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ABSTRACT

In today's competitive world of the industrial sector the load on machines and machine operation has increased, which increases the need for coolant. Coolant is a liquid medium which is used to cool the workpiece when it gets heated during machining operation. There are certain ways of making a coolant which is favorable to different types of work piece operations. Before selection of this project topic, we found the flaws in industries operation in terms of usage of cutting fluid in improper proportion, which affected the quality of the final product. These flaws and lack of quality of product can be avoided by use of a machine system named "COOLENT MIXING MACHINE". The working principle of this machine is based on mixing water and cutting fluid in proper proportion. In our case the proportion taken is 1:20 i.e. 1L of cutting fluid, 20 L of water. By implementing the system, the flaws and lack of quality of final product can be bettered

Keywords: Coolant, Cutting fluid, Water proportion 1:20, "COOLANT MIXING MACHINE"

I. INTRODUCTION

Wherever machining operations take place like turning, facing, boring, drilling etc , the need of coolant would be felt. It acts as a cooling medium for increasing temperature of the work piece during machining. There are ways in which coolant is applied on work piece it can be applied manually or by use of a pump. Coolant is not only used to reduce the temperature of the work piece and the tool, but it can also affect the surface finish of the work piece in both good and bad ways, if not used in proper proportion it will reduce surface finish of final product and vice versa. It is important to mix the fluids in proper ratio according to the requirement of the process and the requirement of customer. Hence, to overcome these problems we

developed a machine system which consists of sensor instruments like floating valve sensor, solenoid valve etc. By use of thissystem efficiency of the process and quality of the final product is increased.

II. OBJECTIVE

- To save labor cost
- To save cost of defect
- To increase productivity
- To enhance production quality
- To avoid wastage of coolant, saving cost of cutting fluid wastage
- Reduce human error

III. METHODOLOGY

- DEFINE THE PROBLEM
- SELECT THE MECHANISM
- DRAWCOCEPT DRAWING OF THE MACHINE
- MAKE SURVEY OF THE AVAILABLE PRODUCT
- SELECT THE REQUIRED PARTS
- DRAW THE FINAL DIAGRAM
- IMPORT THE COMPONENTS
- ASSEMBLY OF COMPONENTS
- PROBLEM TROUBLE SHOOTING
- RUN THE PROJECT
- REPORT MAKING

IV. MAIN COMPONENTS

- Water storage tank
- Solenoid valve
- Timer with relay
- Float valve
- On off switch
- MS holding structure
- Pvc pipe

1. Water storage tank

Fig1

Water drum are made of different types of material in our case we used plastic material drums .We have used three drums 25litre drum for water , 5 litre for cutting oil and 30 litre in which coolant will be mixed.

2. Timer with relay

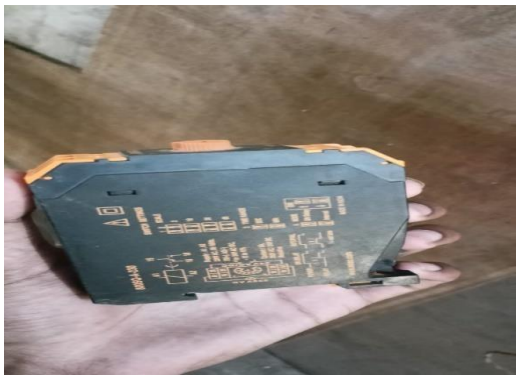


Fig2

Fig 3

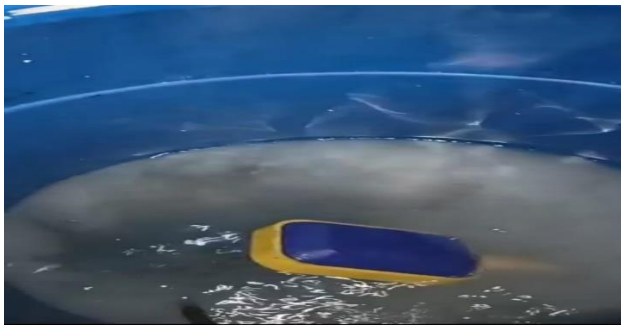
We used SELEC 800-SQ A din mounting timer in this project to cut ON or OFF the supply for appropriate flow of fluid. the function of timer is ON or OFF the solenoid valve for a certain amount of time based on the time delay set in the timer circuit . The timer is for the solenoid which is connected to the drum of cutting fluid .

3. Solenoid valves

Fig4

We used 2 different solenoid valves ,one connected to the water drum and other to cutting fluid drum. The specification of the solenoid valves are as follows .Solenoid connected to water tank is of1/2 inches ,while the other connected to cutting fluid tank is of 6 mm. Used to start the flow of fluids to the third tank

4. Float valve



The float wall is present inside the third drum where the fluids mix with each other . The float valve is a type of sensor or a water level sensor ,it detects the level of water filled in the third tank and thereby sends a signal to the connected solenoid valve to stop the flow of water

5. PVC Pipe

We have used PVC pipes for the flow of the fluid from their respective tank to the third tank. Same type of pipe is used for both water and cutting fluid flow. The specifications of the pipe are as follows

Material of pipe is PVC material.The cross section of the pipe is 8mm dia

6. Switch

We have used simple ON and OFF switch board to supply the electricity through the system

7. Holding structure

Fig7

The function of this structure is to carry the load of all the components of the machine system. It is made with the help of welding process. The material used for this structure is of MILD STEEL (MS). It is more than sufficient to carry the loads of both the drums of water and cutting fluid of 25L and 5L respectively along with the load of other components like solenoid valves ,delay timer, relay circuit

V. COST ANALYSIS

Components	Actual price	Purchase price	Quantity
Solonoid valve 1/2inch	499	350	1
Solonoid Valve 6mm 12V	350	250	1
Tank 25 litres	1500	1350	1
Tank 10 litres	1200	1000	1
Tank 30 litres	1600	1500	1
Timer with Relay	800	725	1
Float Valve	500	390	1
On Off Switch	300	300	1
MS holding Sturcture	1000	1000	
PVC pipe	300	250	1

VI. CONCLUSION

With the help of well guidance of our project guides and the efforts of our project team we have successfully made it possible. It was interesting to see the coolant mixing machine working and each functionality of mechanism was found working properly .. The timing and ratio of the coolant as well as water was appropriate as we wanted i.e. 1:20 ratio and the mixture was mixing properly and the quality was also proper there were no wastage of coolant or inappropriate ratio of mixture thus it will also increase quality of the production so overall it was success for our team and our guide.

VII. Acknowledgement

We would like to thank our mentor **MRS SARIKA LUGDE** in our project work they guided us through out the work of the project. we thank her for the support and guidance in completing of the Project i.e. "**Coolant Mixing machine**". It was a very good learning experience , we have learned new stuff and overall it was a very good learning experience . And We have our Gratitude towards our college "**DATTA MEGHE COLLEGE OF ENGINEERING**" . It would have been tougher for us to successfully complete the project without their support and their platform

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