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DESIGN AND DEVELOPMENT OF HYDRAULIC HOSE CLEANING MACHINE

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ABSTRACT — It is inevitable that the oil or debris in a hydraulic system will contain contamination in particle or flakes form. The sources and types of oil-borne contaminants are well known. Commonly contamination will include particles of silica's, metals flakes, elastomers and fibers of hydraulic hose material. Sizes and concentration of particulate contaminants can be distinguished by manufacturing process. The machines were introduced for the removal of contaminations are based on their operation, some are used before assembly and some are after the assembly.

Keywords- Hydraulic hoses, Hose Cleaning System, contamination Problems,

I. INTRODUCTION

Up to 90% of all hydraulic system failures can be attributed to contaminated oil and debris generated due to manufacturing reported by a recent study found particle contaminated hydraulic oil accounts for all wear. Filtration systems help avert the problem, but knowing what gets into hydraulic oil and why is key to selecting the correct one.

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. The initial cleanliness level of a hydraulic system can affect its performance and useful life. Unless removed, particulate contamination present after manufacture and assembly of a system can circulate through the system and cause damage to the system components. To reduce the probability of such damage, the fluid and the internal surfaces of the hydraulic fluid power system need to be flushed clean to a specified level. Flushing of lines in a hydraulic system needs to be viewed as one means of removing in-built and residual contamination**.**

II. EASE OF USE

This hydraulic hose cleaning system works with same efficiency and improves the utilization of available resources that are used for cleaning. This cleaning system will overcome the problems of existing flushing machine system. In future, automated bullet loading can be introduced for ease of operation by means of use pressurized or compressed air from pressure vessel.

III. REVIEW

The previously used machines like Flushing machine is applicable only after assembly of hydraulic hose. At some instances it is difficult to operate the machine because it requires cleaning agent (liquid) which needs to be heated before operation also it is harmful to operator if leakage takes place. [1]

MegaClean device which is used by some manufacturers consists of nozzle needs to change for different types of hydraulic hoses. [2]

The stated rectification methods for identifying causes of contamination and how to eliminate them. Also the concept of cleanliness in hydraulic system and their standards are proposed by Merritt . H.E. [3]

A theory and relative equations regarding influence of residual stresses induced in the cylinder pressure vessel. The other documents from various manufacturers like Gates Hoses, Parker Hoses, etc., states how the various (Hydraulic and Pneumatic hoses) hoses are manufactured and their assembly on the actual site or location, at the same time cleanliness standards need to be followed with manufacturing proposed by M. Jeyakumar. [4]

IV. PROBLEM STATEMENT

The reason behind failure of hydraulic system were identified. The cleaning devices are already available in the market but they can be used after the assemblage of

hydraulic hoses. So it cannot be used for removal of contamination generated or trapped before assemblage.

V. PROPOSED BLOCK DIAGRAM

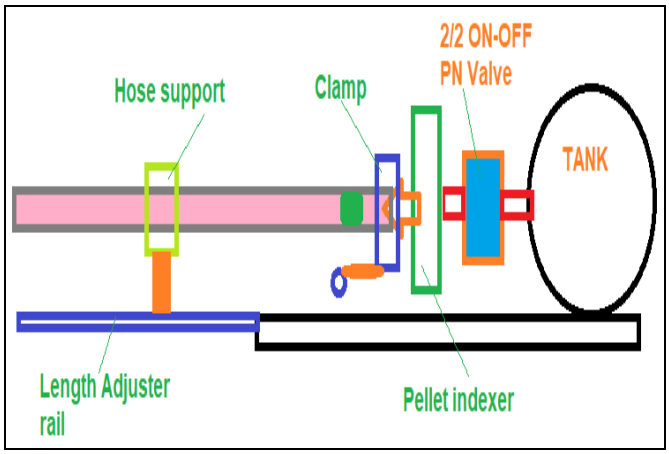


Figure 1: Block diagram of setup

This cleaning machine functions effectively during the operation which had more sophisticated nozzle design which accommodates various diameters of hoses and simultaneously provides clamping to them. The pallet indexer introduced contains the bullets of thermosetting plastic which we have to put all the time whenever we performs the cleaning operation. It comprises of construction materials which are available in market, works efficiently and simple to build.

a) Pressure Vessel

- **Specifications:**

Table no. 1

Description	Dimensions
Cylinder outside Diameter	194 mm
Cylinder inside Diameter	176 mm
Cylinder Length	214 mm
Cylinder volume (actual)	5.20 ltr
Cylinder volume (useful)	2.60 ltr
No. of Test	6

The Planned dimensions of the cylinder are such that the pressurized volume of the cylinder is to be close to 5.6 ltrs, hence the dimensions of the cylinder assumed are 194 mm OD, 176 mm ID and 214 mm Length - Volume close to 5.20 ltr.

b) Nozzle & Clamp

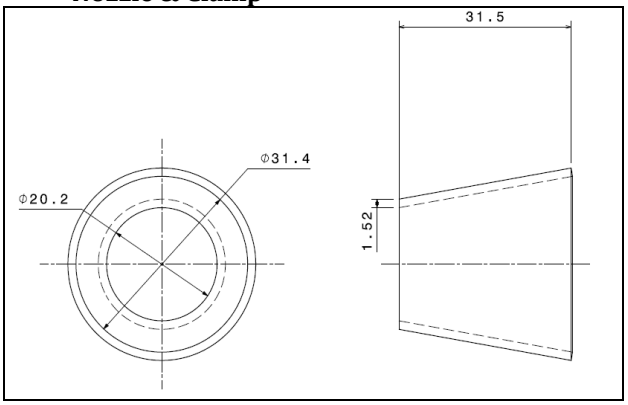


Figure 2: Nozzle & Clamp

Nozzle is a combination of projectile shooter and first end of clamp which serves the two purposes. As per the available specimens ranges between starting from 20.2 mm to 31.4 mm.

- **Specifications:**

Table no. 2

Sr. No.	Description	Hose OD	
		Inch	mm
1	6 EFG6K	3/8	20.2
2	8 EFG6K	1/2	24.0
3	10 EFG6K	5/8	27.8
4	12 EFG6K	3/4	31.4

c) Pallet Indexer

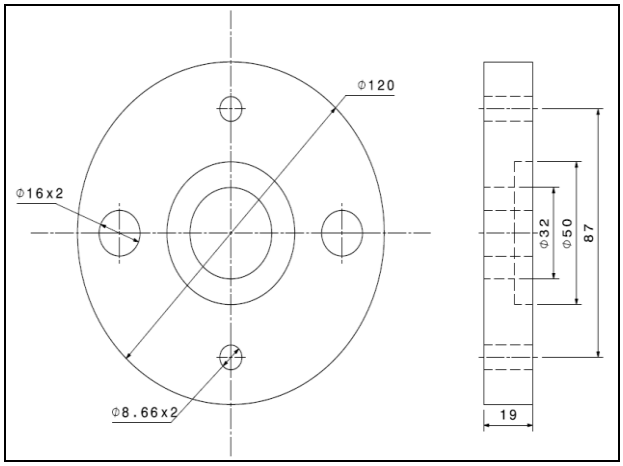
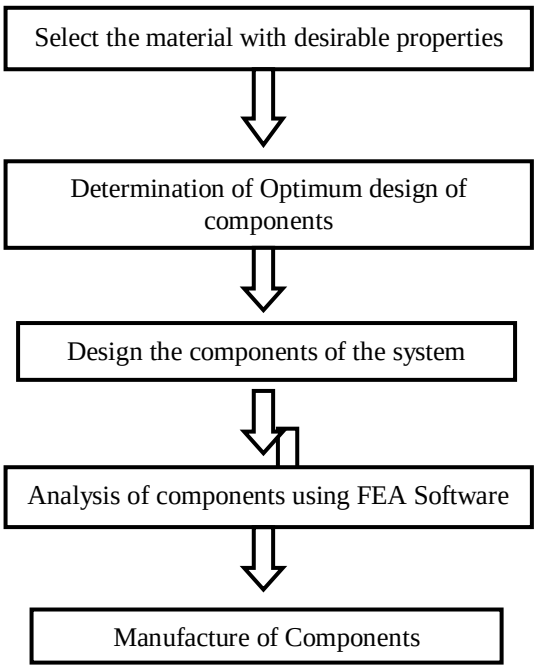


Figure 3: Pallet Indexer

Indexer is a loader used for loading projectiles (Sponge Bullets), which are going to be injected into the hydraulic hose with the help of compressed air.

VI. METHODOLOGY



VII. CONCLUSION

- The system designed has simple and robust construction compare to other equipment.
- It can be used in both ways as a hand-held and bench-mount configurations.
- It is ideal for portable small volume applications, and large volume production applications.

VIII. ACKNOWLEDGMENT

It is pleasant Endeavour to present paper on **"Design and Development of Hydraulic Hose Cleaning Machine"**. I am thankful to **Prof. R. Y. Daspute** HOD (Mech.) & Principal **Dr. S. B. Ingole** for their guidance, constant supervision as well as for providing necessary information regarding the project.

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