

**REVIEW ON DESIGN AND ANALYSIS OF HYDRAULIC SYSTEM TO IMPROVE  
PERFORMANCE OF SMALL POWER PACKS**

**Saurabh Janbandhu\*, Prof. Dr. A.K.Mahalle, Er. Ravi Kotangale Mechanical**

Departement of Mechanical Engineering, GHRCE, Rashtrasant Tukadoji Maharaj Nagpur University

Professor at Department of Mechanical Engineering, GHRCE, Nagpur, MH, India

Spannkraft Hydraulic systems Private Limited, Nagpur, MH, India

DOI: 10.5281/zenodo.47616

**ABSTRACT**

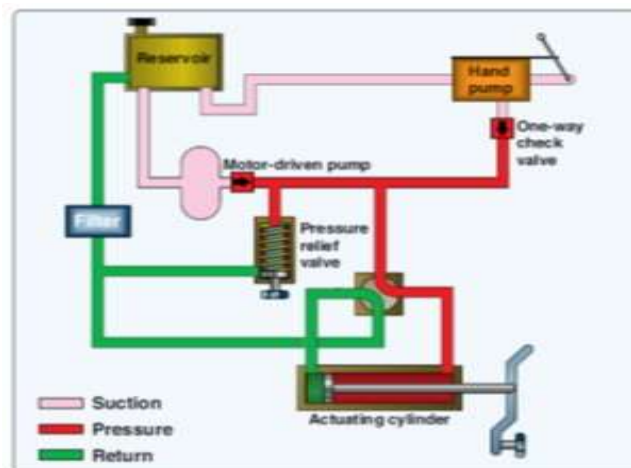
Hydraulic systems are widely employed in most of industries like for rollers, cement industries equipments etc used for high force movements to obtain motion in the process. And in the large scale industries all the facilities are provided for maintaining the efficiency of the hydraulic system, since they have investments and experienced personals. While on the other hand small scale industries don't have all the facilities and even they run their hydraulic systems for prolonged hours without caring about maintenance procedures so it results in the breakdown and early failure such that quality of oil will not be maintained and the desired effect of motion will not be obtained effectively. So to maintain the effectiveness of the system for quality operation a case of one of the industries is taken where a hydraulic system is working in pellet plant such that the readymade manufactured extension equipment don't fits because of a random case therefore we looking forward to design an extension system for the available data recorded and the identified problem.

**KEYWORDS:** Hydraulic system, Industry problem.

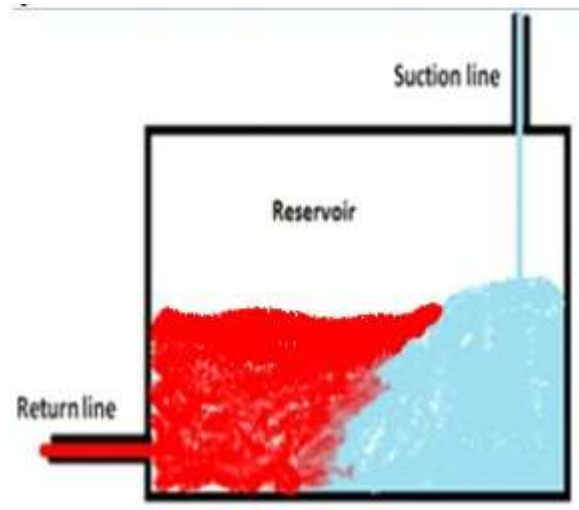
**INTRODUCTION**

The Hydraulic system consists of a reservoir from where the oil is pressurized by the means of pump to the various pipe lines through hoses supplies it reaches to the cylinder which gives the force movement. And the cylinder reciprocates for twenty Four hours which leads to the heat generation of oil so the desired pressure is affected and life span also decreases. Temperature is indicated in the temperature gauge at tank mount. And if the quality degrades it also increases the cycle time which is a big loss to the industry. So designing the extension system to reduce the heat and its effects techniques are studied and analyzed. It will be a filtration with cooling system.

**STRUCTURE OF BASIC HYDRAULIC SYSTEM**



**CONDITION OF OIL LEAVING AND ENTERING INTO THE SYSTEM**



**FIG 2**

The oil returning to the system after completing the cycle is hot, the temperature is raised from the initial which leads to the degradation or lag in the pressure development in the system. The red zone shows the hot oil entering to the reservoir from the return line. And on the other side blue region is the oil to be sucked which is to be delivered for working the system.

**PROBLEM STATEMENT**

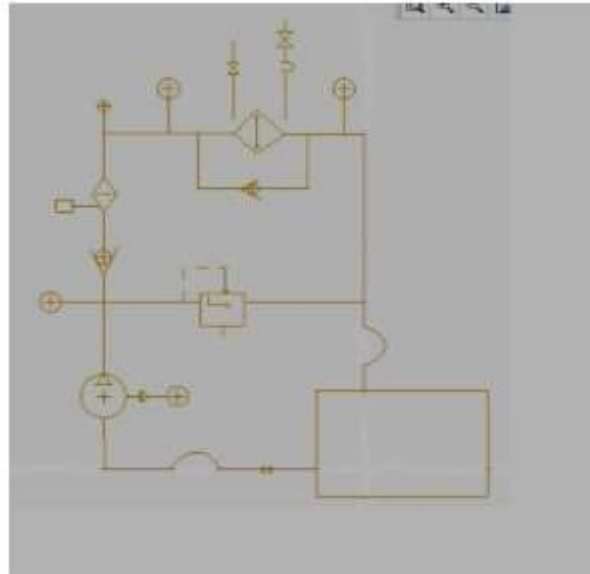
Study the existing Hydraulic system design and its performance under load as well as high temperature. Select solution for drawback which comes due to the temperature.

**OPTIMIZATION PROCESS**

[1] The paper has development of reservoir tank explanation to swirling and random instability of flow so to minimize this designing and using baffle plates analyzing through software such as CFD. It is a fluid flowing simulation in the tank. Reducing the oil swirling phenomena by variety of designs in comparison to industrial tank simulation for the flow is carried out.

[2] In this paper of the of Hydraulic Power Pack performance by increasing enhancement of heat dissipation” described hydraulic unit is part of any system providing power movements and heating up is caused due to inefficiencies which leads input power to waste. Like the need of oil cooler it will act for the cooling function. Reservoir is simple rectangular box which dissipates the heat that has to be painted and corrosion resistant. Conversion of input into heat so to reduce heat generation the construction and design of tank has to be changed and modified for better operation. Also fins will help to escape and reduce the temperature rising.

[3] “Vertical Turret Lathe is designed with hydraulic power pack compositely for various motions like clamping and holding it, unclamping is attended by hydraulic power system. Hydraulic systems are compacting versatile and reliable it is used integrally. Automation mechanization is easily done with hydraulic drives and controls. Industrial movement system is inconceivable without hydraulics so has to be maintained and studied for improved performance. Extent which is modified considering the environment condition and the live situation. So after above studies we can design a system or sub system for achieving the system run without any failure.

**METHODOLOGY**

*Fig 3.*

Figure shows the line diagram for filtering and cooling the main system. It is a subsystem which is to be placed apart from the main system such that for the maintenance purpose, by this our hydraulic system will work properly with the desired performance. This consists of motor pump, filter, heat exchanger, temperature gauges to indicate the temperature.

**CONCLUSION**

From the review of research paper it is found that it needs a separate system which will work as filtration cum cooling unit. The design prepared as a sub system.

**REFERENCES**

- [1] M.L.C. Lahari & DR.B.S. REDDY, "Enhancement of the Performance of Hydraulic Power Pack by Increasing Heat Dissipation" International Journal of Computational Engineering Research (IJCER), (2014)
- [2] Lovrec and Tic.v "DESIGN OF MODERN HYDRAULIC TANK USING FLUID FLOW SIMULATION" International Journal of Research in Mechanical Engineering, 2014
- [3] M. Rama N. Reddy, "Design of Hydraulic Power Pack for Vertical Turret Lathe" International Journal of Research in Mechanical Engineering, 2014.