DESIGN AND MODELING OF SHOCK ABSORBER

Satish Kumar Patel[1], Prakash Kumar Sen[2], Shailendra Kumar Bohidar[3]
[1]Student Bachelor of Engg., [2,3]Faculty
Department of Mechanical Engg., Kirodimal Institute of Technology Raigarh (C.G.) INDIA

Abstract: In this paper properties of resistance force of a shock absorber using magnetic functional fluids having both micrometer and nanometer - sized magnetic particles. A fabricated micro- mechanical sensor is assess the condition of automotive shock absorber is presented. In addition, a.23.1 m thickness square membrane and two buried resistors are used for pressure and temperature sensing respectively. The result supremacy of the system having damping coefficient limit of 400 N- S/m. The optimized system performs will fulfilling requirement of minimum percentage and rapid stabilizing time.

I. INTRODUCTION

Application utilizing magnetic functional fluid having both micrometer and nanometer- sized magnetic particles has been developed [1].The resistance force of shock absorber is investigated experimentally. Two magnetic functional fluids whose mixture ratio of micrometer and nanometer - sized magnetic particle is different are prepared for the experiment. Shock absorber, key components in a vehicle suspension system. Play an components are subjected to gradual wear and shocks absorber are used [2-3].More precise testing can be performed on a dedicated dynamometer, where a shocks absorber velocity force diagram can be collected [2-4] To address this issue, a monitoring system concept and an assessment method capable of continuously monitoring shocks absorber condition has been proposed [5-6]. Trials done with an adjustable shock. Absorber instrumented with macro shocks mounted on a vehicle validated the presented assessment methodology to determine the dampers condition with unknown excitation [7].

II. DAMPER DESIGN

The twin tube is most widely used design configuration for damper, as it serves many purpose of the damper.

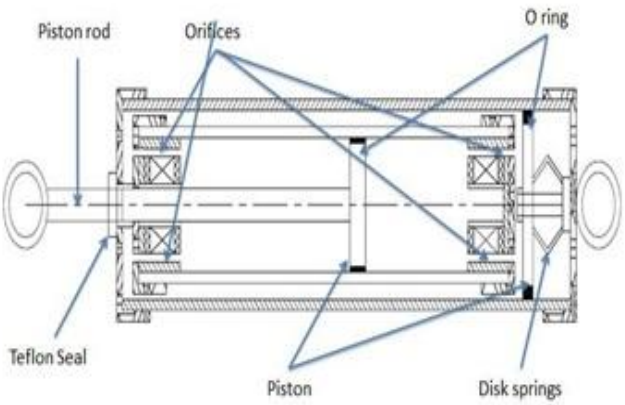

Fig:1- Twin tube MR damper

An inline accumulator was used to ease manufacturing process involved. Jhon (999) and Khan (2010) have given design criteria for various components of damper. The outer cylinder is filled with nitrogen to pressurize the fluid inside the damper fig (a) show the design model of designed damper.

III. MODELING OF SYSTEM

For simulation purpose quarter car parameter have been taken [8]. Road disturbance profile comprises combination of two sinusoidal inputs. The simulink model is depicted in fig (b).

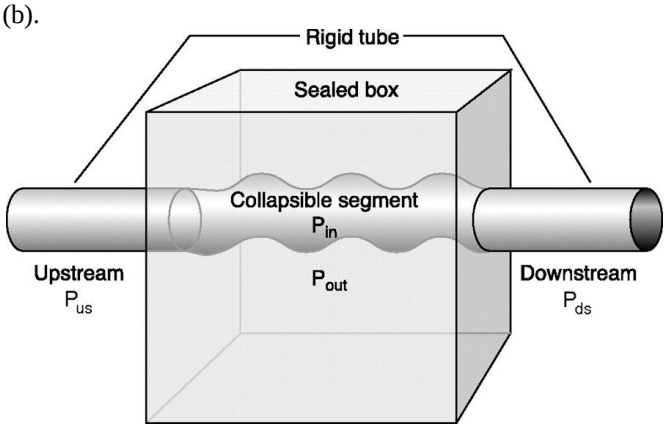

Fig:2- Modeling of road disturbance profile

IV. MODELING OF SEMI- ACTIVE SUSPENSION SYSTEM

For a semi active suspension simulink model the damping coefficient need to be varied. In order to incorporate the varying capacity of damping coefficient, a fuzzy logic controller in added in simulink as shown in fig (c).The fuzzy are designed on the basis of different damping coefficient limits of 3000, 4000 and 5000 N s/ m.\

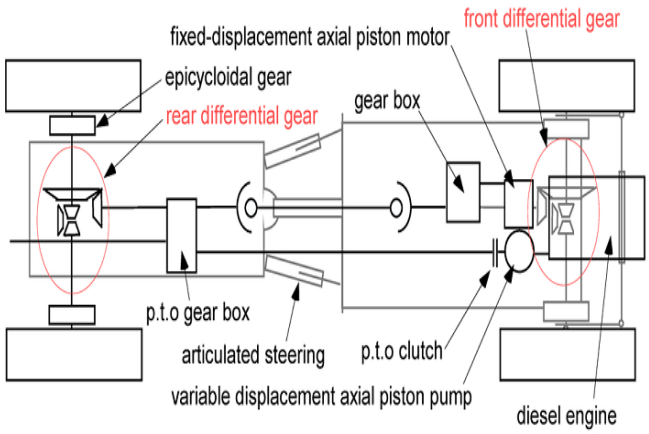

Fig:3- Semi-active quarter car suspension model in simulink

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V. SOCK ABSORBER

One design consideration, when designing or choosing a shock absorber, is where that energy will go. In most shock absorbers, energy is converted to heat inside the viscous fluid. In hydraulic cylinders, the hydraulic fluid heats up, while in air cylinders, the hot air is usually exhausted to the atmosphere. In other types of shock absorbers, such as electromagnetic types, the dissipated energy can be stored and used later. In general terms, shock absorbers help cushion vehicles on uneven roads. [10]

Fig;4- shock absorber

VI. CONCLUSION

Effects of composition of the magnetic functional fluid, the magnetic field are the load on resistance force properties of the shock absorber using magnetic functional fluid [9]. The integration of such a monitoring system in the shock absorber allows near time assessment of its condition and performance and will represent a major improvement to vehicle safety. Sami active suspension system has been designed based on variable damping coefficient limit. The system having damping coefficient limit of 4000N s/ m performs the best in term of ride comfort.

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