FLUID FLOW MODELLING OF A FLUID DAMPER WITH SHIM LOADED RELIEF VALVE

NITIN V. SATPUTE[1], SHANKAR SINGH[2] & S. M. SAWANT[3]

[1]Assistant Professor, Department of Mechanical Engineering, Vishwakarmna Institute of Technology,
Pune, Maharashtra, India

[2]Associate Professor, Department of Mechanical Engineering, Sant Longowal Institute of Engineering and Technology,
Longowal, Punjab, India

[3]Professor, Department of Mechanical Engineering, Rajarambapu Institute of Technology, Sakharale,
Sangli, Maharashtra, India

ABSTRACT

Automobile shock absorber consists of a dissipative element connected in parallel with an elastic element. Fluid damper are most reliable to be used as a dissipative elements in the vehicle shock absorber. Damping action in fluid shock absorbers is obtained by throttling viscous fluid through an orifice. Fluid shock absorbers offer sufficient damping force with compact size, also the damping force is linear in nature. Damping force of the fluid damper depends on orifice properties and on the physical properties of oil used. The paper discusses mathematical modelling of the fluid damper which uses number of shim controlled orifices. FEA is performed to compute stiffness of the shims used with the orifices. Matlab programme calculates pressure difference and damping force across the piston using fluid flow continuity equations. Finally single degree of freedom Matlab simulink of the damper is used to find displacement transmissibility for range of frequencies.

KEYWORDS: Shock Absorber, Automobile Suspension, Fluid Damper