Experimental Study of Suspension Characteristics and Energy Recovery Hydraulic Electro Mechanic Shock Absorber Two Compression Hose One Rebound with Accumulator Load

Name: Dodi Tri Handriyanto  
NRP: 2111 106 028  
Major: Mechanical Engineering  
Supervisor: Dr. Eng. Harus Laksana Guntur, ST., M. Eng.

ABSTRACT

The development of the automotive industry in Indonesia is growing rapidly. Growth in the number of motor vehicles is inversely proportional to the availability of fossil fuels, where the number of vehicles while the availability of more and more fossil fuels decreases. According to research by the Center for Energy, Transportation, and the Environment (CETE), motor vehicle only distribute 16% of the fuel energy is used. The remaining 62% to the engine as heat and vibration losses\textsuperscript{[1]}. One way to improve efficiency is to utilize the wasted energy, one of which is to utilize the energy dissipated in the suspension through the concept of Regenerative Shock Absorber (RSA).

In this research, experimental studies the characteristics of Regenerative Shock Absorber (RSA) called Hydraulic Electro Mechanic Shock Absorber (HEMSA), by analyzing the effect of the amount of hose (port), the characteristics of the suspension, and the energy recovery of the model due to the periodic and impulses excitation at frequency levels and amplitude were varied. Measurement of energy recovery is done by using a quarter car suspension test rig. The mechanism that will be used is to install Hydraulic Electro Mechanic Shock Absorber (HEMSA) is on the tools which will be given a test mass that represents $\frac{1}{4}$ of the vehicle (city car).

From this study it was found that the effect of the amount of hose (port) HEMSA two compression hose on the force of the rebound effect that can be transferred from hydraulic cylinder
one (absorber) when compression is greater than at the time of rebound, damping constants HEMSA value without the imposition of 3887.5 Ns/m, while the value of the damping constant HEMSA accumulator charging when charged 0%, 55%, and 100%, respectively for 4244.5 Ns/m, 4494 Ns/m, and 4779.5 Ns/m. Energy accumulator charging current generation HEMSA charged 0%, 55%, and 100%, respectively, when the frequency of 1.4Hz is equal to 0.2 watts, while the frequency 1.7Hz is equal to 0.37 Watts, and when the frequency of 2Hz at 1.65 Watts.

Keywords: Energy recovery, Hydraulic Electro Mechanic Shock Absorber (HEMSA), suspension, vehicle testing.