An Innovative Approach to Vehicle Suspension: Creating Retrofit Dampers to Minimize Gasoline Consumption and Carbon Dioxide Emissions

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Only 14-26% of the energy from the fuel you put in your tank gets used to run your car. The rest of the energy is lost to engine and drive-line inefficiencies or used to power accessories. Thus 8 out of 10 gallons put in your tank are not used to propel the vehicle. This experiment involved designing and creating shock absorbers so it can harvest energy through bumps on a road. A car was built with a fifth wheel connected to the shaft of a gear reduction motor. When the vehicle encounters any bumps the fifth wheel would move vertically acting as a suspension mechanism and would turn the shaft of the motor, creating energy. Then a shock absorber, which can be implemented into vehicles, was built. This prototype consisted of a hydraulic motor and a generator. The hydraulic pressure exerted in convention shock absorbers can now be used to power the hydraulic motor, creating torque and angular displacement. This can be then connected to a generator to produce electricity. The purpose of this experiment was to see if it is possible to recover energy from bumps in the road through shock absorbers and turn it into useful energy. Three tests were conducted: measuring energy yield based on displacement of the wheel, effects of speed on electricity produced, and efficiency of displacing an input force. Results from my prototype car along with the regenerative shock absorber indicated that there would be an increase of 17% fuel efficiency, thus resulting in less CO_2 emissions. This experiment is very relevant to the world because climate change is increasing, and there needs to be an efficient solution to stop this problems. The solution does not only have environmental significance, but also an economic significance, and can be very beneficial to the army or military.

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