Press Energy: Generating Electric Energy Using Pressure Forces

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The objective of this project was the design, construction, testing and evaluation of a mechanism to harvest pressure energy from automotive traffic and using it to generate electricity. The project included the construction of an apparatus that captured the pulse pressure of an automobile to drive a gear assembly which in turn drove a direct current generator. The output of the generator supplied energy to charge a battery. Measures of voltage output based on different observed traffic pulse frequencies were completed to complete feasibility studies for different times of traffic. This project also included the programming of a traffic simulator to further assists in demonstrating the feasibility of this idea as a practical way to harvest otherwise wasted energy. The simulator was based on statistical modeling of distances and speeds between cars from direct observation at toll plazas near Ponce, PR. Two main applications were considered in the analysis. The first one was the deployment of the Press Energy Generator (PEG) in a drive-through scenario at posted speeds up to 24.59 m/s (55mph). The second one was the deployment of the PEG in stop-pay-go scenario in normal car acceleration scenarios. In both cases the PEG mechanism was successful in generating enough electric power during several hours of traffic to charge a battery. The mechanism can be further improved with more effective gear assemblies and generators to increase electric power generation. The cost of implementation for both applications was calculated based on current construction materiel costs.

Awards Won: