EFFECT OF DRIVER PERFORMANCE ON VEHICLE ENERGY EFFICIENCY

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ABSTRACT

The fuel consumption of a vehicle has direct relationship with the user's driving style, apart from many other factors affecting on it. Driving style is very different from one driver to another. Acceleration, braking and gear changes of a person directly contribute to give different values of fuel consumption on a particular vehicle. It is common knowledge that road vehicles dominate national oil consumption and are one of the largest and fastest growing energy end-users. Poor driving styles lead to high fuel consumptions and result in wastage of national economy.

This research study focused on to study the behavior pattern of the drivers and therefore finds any relationship exists between the fuel consumption of the vehicle and their driving styles. Therefore the research experiments were carried out mainly concentrating on fuel consumption tests on selected ten vehicles and driver behavior tests on same ten vehicles.

The vehicles selected for the fuel consumption test were the vehicles with satisfactory engine performances as well as with good suspension systems in order to avoid erroneous conclusions on the research study due to the poor vehicle conditions. The key parameter selected was the fuel consumption, the distance that the vehicle travels per unit consumption of fuel and measured in kilometers per liters (km/liter). Separate test equipment was designed and fabricated to measure the fuel consumption of the vehicles during the fuel consumption tests. All the trials of the vehicles were carried out under test driving condition, keeping the engine RPM into steady state as much as feasible and avoiding rapid accelerations / decelerations. The roads with the minimum traffic and carpeted conditions were utilized to conduct these tests and therefore the drivers could achieve the desired object of the tests. Drivers utilized for the trials were also the experienced personnel who had better knowledge about the test. These fuel consumption tests were conducted varying the tyre pressures; OEM recommended/standard, increased and decreased in order to investigate the affect on same to the fuel consumption of a vehicle. Fuel consumption of the vehicles during the trial conditions and speed changes of the vehicle with respect to the time were recorded and plotted on the graphs.

The same vehicles selected for the fuel consumption test were utilized for the driver behavior test. Each vehicle was tested with three different randomly selected drivers during the test and recorded their speed changing patterns against time. The roads selected for these tests were well carpeted roads with minimum traffic congestions. Therefore the possibility existed for the drivers to drive at almost steady engine RPM. These drivers were well briefed to carry out their normal driving patterns and observer was utilized for the monitoring their driving style as well as to record the speed changes against the time intervals. These data were plotted on the graph in order to display their individual driving patterns. Total fuel consumption during the test was also recorded. In addition questionnaire was distributed among these drivers to gather certain information on their personal life, attitudes, driving experiences and the details relevant to the

profession. Comparison table was prepared at the end of the test on each vehicle and compared the driving patterns of all three drivers used for the driver behavior test on each vehicle.

According to the calculated and gathered data, each driver displayed different amount of fuel consumption or mileage readings on same vehicle. This variation clearly attributed to the behavioral pattern of drivers while carrying out their profession and research could arrive the conclusion of that there is a relationship exists between the driver behavior and the fuel consumption of the vehicle. Therefore research study could build up the hypothesis on:

"Significant relationship exists between energy efficiency of vehicle and the individual behaviour of the driver while performing his profession".