Some evidence on determinants of fuel economy as a function of driving cycle and test type.
Some Evidence on Determinants of Fuel Economy as a Function of Driving Cycle and Test Type 931804

Statistical methods are used with 107 vehicles whose fuel economy was presented and reported for five test types in a single publication by Consumers Union (CU) for 1986-1988 vehicles. Standard loglinear statistical formulations (i.e., multiplicative models of interactions) are used with data from this and supplementary sources to develop coefficients estimating the percent fuel economy gain per percent change in engine/vehicle design characteristic. The coefficients are developed for the five different test conditions evaluated by CU and are compared with each other on the basis of attributes of the tests. The insights of engineering models are used to develop expectations regarding the shift in size of coefficients as driving cycles change. For the effects of weight reduction, a range of coefficients is estimated whose high and low values are remarkably consistent with the range of values developed by nine sources cited in the 1992 National Academy of Sciences (NAS) study, "Automotive Fuel Economy." In both the engineering models and the statistical model, the effect of weight is estimated to be higher in urban driving than in highway driving. For two test categories - field tests and dynamometer tests - the benefits of weight reduction are statistically estimated to be greatest in urban driving conditions. The effect of weight in the statistical model is estimated to be greater than in the previously developed engineering models, when terms including weight are estimated to vary due to changes in weight. Prior engineering model equations do not write weight into the terms explaining fuel consumption during idle and unpowered deceleration (predominantly braking). The effect on idle fuel flow rate of designing vehicles to hold performance roughly constant by maintaining power per kilogram and/or displacement per kilogram is examined, and its implication for the size of the weight effect is simply approximated from Sovran's 1983 engineering model results. The fuel-economy-decreasing effect of the desire for performance is estimated to be somewhat larger in the statistical analysis than in the NAS study, when engine technology is held constant.

DOI: [https://doi.org/10.4271/931804](https://doi.org/10.4271/931804)

Citation: Santini, D. and Anderson, J., "Some Evidence on Determinants of Fuel Economy as a Function of Driving Cycle and Test Type," SAE Technical Paper 931804, 1993, [https://doi.org/10.4271/931804](https://doi.org/10.4271/931804).

Download Citation

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Pages: 15

Event: Future Transportation Technology Conference & Exposition

Also in: SAE 1993 Transactions: Journal of Passenger Cars-V102-6

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We test three versions of fuel consumption feedback in a field test in which each driver completes a natural driving quasi-experiment. To enhance the generalizability of our estimate of the efficacy of the three tested screen designs, thirty to forty participants were enrolled in three distinct regions in two states. Addressing the questions requires that we collect data suitable both for a quantitative test of on-road fuel economy in response to three types of feedback and for a mixed quantitative/qualitative description of the drivers and their experience of the field test. The resulting dataset the amount of fuel saved depends on the type of route and traffic patterns. There is some anecdotal evidence that the EPA tests are the reason for the slow introduction of IS technology in North American vehicles (Motavalli 2010). In reality, however, it is quite likely that there is a significant amount of idling by North American vehicles in real-world driving. The dynamometer testing included the drive cycles designed for the North American (a series of cycles developed by EPA, including NYCC that represents dense-traffic conditions), European (the New European Drive Cycle (NEDC) developed by the European Federation for Transport and Environment), and Japanese (the JC08 cycle) markets, as described in the following sections.