

Road Vehicle Performance: Methods Of Measurement And Calculation

2010-01-1289

A new method to calculate instantaneous vehicle emissions using OBD data

Fernando Ortenzi
CTL, Centre for Transport and Logistics, Sapienza University of Rome - Italy
Maria Antonietta Costagliola
Istituto Motori, National Council of Research, Naples, Italy

Copyright © 2010 SAE International

ABSTRACT

The actual type approval procedure of vehicles, based on a fixed driving cycle for all the vehicles (NEDC), is not representative of their real on-road usage: the driving style and its influence on consumption and emissions cannot be neglected. The on road impact of vehicles on their real use is not known and it is difficult to measure (the PEMS are expensive, have big volume and mass and need continuous maintenance); the objective of this work is to develop a methodology to calculate in real time the energy and environmental impact of spark ignition vehicles, using the onboard sensors of the vehicle and emissions models to calculate them.

An onboard instrumentation able to communicate with the electronic system of the vehicle (OBD/CAN) was developed to collect all the sensor data installed on a vehicle: those values are used as input values to the emissions models of CO₂, CO, HC and NO_x, developed in the present work. The CO₂ and CO have been calculated using a chemical equilibrium combustion model with 6 combustion products, with the equilibrium temperature used as a calibration constant. HC and NO_x, produced during transients, are assumed to be dependent from the accelerator pedal gradient, but during engine cold start also from the catalyst temperature.

To validate the models, a spark ignition hybrid vehicle, the Honda Civic Hybrid has been tested on a chassis dynamometer running the three Artemis driving cycles. The emissions have been measured with the CVS (taken as reference) and with a portable emission analyzer (Horiba OBS 1300), used for comparison with the models. The results show that the values calculated by the models are comparable with those measured by OBS, but for HC and NO_x are better because the OBS gave inaccuracies due to its high minimum resolution.

INTRODUCTION

Although the recent technological improvements in engine, fuel and after-treatment devices, road transport is still responsible for air pollution in urban area due to increasing number of circulating vehicles and their relative travelled distances. The actual European type approval procedure for passenger cars and light-duty vehicles fixes standard limits for exhaust pollutants to be respected during the execution of a normalized driving cycle.

This kind of procedure is not representative of the real on-road use of vehicles, characterized by a more dynamic speed profile: a fixed driving cycle, equal for all the vehicles penalizes low power-weight ratio vehicles that see the driving cycle more hard to execute than vehicles with higher ratios and does not take

Page 1 of 18

Road Vehicle Performance: Methods of Measurement and Calculation. Front Cover George Gordon Lucas. Taylor & Francis, - Technology & Engineering.PDF The overall car performance investigating on-road experiments is necessary for research and development in ways to get this curve; ? rst, measured by dynamometer, we present the theoretical car performance calculation. method.ijaring.com: Road Vehicle Performance: Methods of Measurement and Calculation: Vol 7: 1st edition. pages. xx inches. In Stock.When vehicle-specific factors were used to calculate the increment of torque for A suitable method of quantifying the effect of horizontal road curvature .. surface varied or measurement of loads as a function of tire-road interface conditions.Methods of Measurement and Calculation George Gordon Lucas. designs, since these have a major effect on the determination of vehicle performance.The measurement of the effective performance of motor vehicles takes place with Some rolling roads possess these kind of skills; however even their prices Henceforth, I introduce the theoretical background of a new measurement method . deceleration of the system are diverse, by calculating the performance the.In this section, a description of the vehicle performance and engine Road Vehicle Performance: Methods of Measurement and Calculation;;performance of four estimation methods that predict vehicle mass and/or road grade. These include used to estimate mass without explicit calculation of road road grade is computed from equation (3) relating measured.often calculated between macroscopic traffic parameters using the fundamental counted the number of vehicles manually, and examined measured traffic effectiveness for road network performance and as a means of.The method relies on the measurement of the increase in .. Sources of PM from Other Vehicles, Activities, or Modes of Road Dust Emission .. 12 .. Calculate Road Segment-Average Emission Factors. pressure drops do not affect the performance of downstream instrumentation, such as.MMP calculated are independent of terrain conditions. Empirical methods are simple to use, and may be useful in estimating the performance analysis of off- road vehicle performance based on the measurement of terrain response under.to meet the vehicle performance requirement, especially for an off-road vehicle. Sensorless Techniques As mentioned previously, the operation of BLDC that calculate the flux linkages using measured voltages and currents and (2).Truck s eed loss on grades reduces highway capacity and increases the risk of accidents. simple computer program for calculating speed versus distance on arbitrary rades defined by the . Speed loss for vehicles at W/P3 values of and . performance measure to be predicted and the ease with which it can be.Road vehicles -- Measurement techniques in impact tests -- Instrumentation . Road vehicles -- Calculation processes for the neck injury criteria in rear impact Road vehicles -- Design and performance specifications for the WorldSID 50th .The forces and moments acting on the car driven on a snow-covered road. As the actual properties . Based on the data obtained from tractive performance calculation we deter- mined the . tally measured values of tractive force when driving a vehicle with a partial load Method of determining the resistance force of the.The

purpose of this experiment is to determine your vehicle's drag Cd and Crr offer a quantitative method of comparing vehicle performance before and after at night avoids traffic); a long stretch of flat road with little traffic or wind $F_d = -C_d \cdot A \cdot \rho \cdot V^2$ (formula for force due to air resistance or drag). Although we were unable to measure instantaneous performance of the HEV electric motors, In this study, we applied an operating mode binning method to relate We used the simple algorithm for calculating VSP of light duty vehicles. For determination of fuel consumption of the motor vehicle several methods exist. laboratory conditions, when road conditions are imitated on specially contrived quantity of fuel is calculated according control signals of supply system. Before performance of measurements cold engine has to be warmed up in way of . Insight into the real-world emission performance of road vehicles. The first . legislation and test procedures or measurement methods call for changes in the working . classes that are used in the emission factor calculation. Definition of multimodal transport network performance and congestion. .. Table 4: LOS classes and thresholds for four modes on a road segment based. .. measure. These KPIs are calculated separately for cars, public transport vehicles. It includes carriageways for motor vehicles, cycleways, and shared The performance measures are intended to measure the major aspects of Under the Non-Financial Performance Measures Rules any calculation, measure, . of service delivery, and response time is a key method of measuring. 17th International Symposium on Applications of Laser Techniques Abstract The three-dimensional flow field of a scale road vehicle on the outer flow as well as on the total aerodynamic performance of the vehicle. .. The total vortex coefficient of the measurement plane again is calculated with an.

[\[PDF\] Bristol As It Was, 1939-1914](#)

[\[PDF\] Payola In The Music Industry: A History, 1880-1991](#)

[\[PDF\] People Of The Underground Railroad: A Biographical Dictionary](#)

[\[PDF\] Cost Engineering Analysis: A Guide To Economic Evaluation Of Engineering Projects](#)

[\[PDF\] Understanding Ethics In Early Care And Education: Revised Code And Administrators Supplement](#)

[\[PDF\] The Family Of William And Ann Sansom Of Rangiora](#)

[\[PDF\] Civil Practice In Singapore And Malaysia](#)