

# PRECISION FUEL-CONSUMPTION MEASUREMENT FOR RATING THE QUALITY OF SERVICE OF URBAN ROUTES

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## ABRIDGMENT

•A PILOT study to determine the practicality of using precision fuel-consumption measurements to rate the quality of service of urban streets was carried out in downtown Potsdam, New York, during 1971. The use of precision fuel-consumption measurements to rate traffic service levels is based on the concept that, in general, each traffic factor responsible for travel inconvenience, delay, discomfort or combinations of these also causes a minute increase in fuel consumption. It is possible with precision fuel-consumption measurements to detect the accumulated excess fuel consumption attributed to these factors. These measurements could provide a convenient means for rating the quality of service of urban routes.

In the pilot study, a passenger car equipped with a precision electronic fuelmeter was operated at least 10 times over each of three downtown routes between common end points. Each route had a different set of conditions affecting traffic flow. Fuel consumption to the nearest 0.001 gal and time to the nearest 0.1 sec were recorded for each trip as well as a count of major speed changes and of evasive traffic maneuvers executed. The precision electronic fuelmeter used in this study is described elsewhere (1, p. 83).

The pilot study provided definite evidence that precision fuel-consumption measurement could be used as an effective and convenient means of rating quality of traffic service. There is a close relationship between quality of service ratings found by this measurement and quality of service as evidenced by regularity and smoothness of travel. Precision fuel-consumption measurements are sensitive not only to large speed changes, prolonged operation at reduced running speeds, and stopped time but also to the multitude of small changes in direction and speed that continually plague vehicles in traffic. Furthermore, for an attempted speed of 30 mph (representative of urban routes), each traffic factor affecting vehicle operation to the detriment of travel comfort and convenience also tends to increase fuel consumption.

However, a much broader research study is required to define the specific utility and applicability of this investigative technique for developing information on the service quality of urban routes. Further test operations should include the use of equipment for detecting and recording small speed changes (on the order of 2 to 3 mph). The frequency of small speed changes and their value ranges can be combined with the frequency of stop-and-go and other large speed changes for evaluation of the sensitivity of fuel-consumption measurements to speed changes.

The development of means for precision fuel-consumption measurement has made possible a new method for rating the quality of service of highways, particularly urban routes. Precision fuel-consumption measurement is attractive for rating quality of service because the needed measurements not only are easy to make but also reflect directly the accumulated effect of most traffic factors that affect travel comfort.

## REFERENCE

1. Claffey, P. J. Running Costs of Motor Vehicles as Affected by Road Design and Traffic. NCHRP Rept. 111, 1971.