Driving Simulation for Analyzing the Safety and Fuel Saving Effects of a Connected Bus System on Freeways

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Abstract

This study conducts a bus driving simulation to analyze the safety and fuel saving effects of a connected bus system in freeway car-following conditions. Based on two assumptions that “the shorter the perception-reaction time, the safer the bus drivers’ responses to a sudden event” and “the smaller the deceleration rate, the more fuel saving of bus driving”, bus driving characteristics are collected and analyzed, including perception-reaction time and deceleration rate. After basic statistical analysis and t-test, the experimental results indicate that the average perception-reaction time of bus drivers in the connected bus system has become shorter significantly when an emergency event happens. The average deceleration rate in the connected bus system is also reduced when the range of warning timing is less than 70 meters between the lead vehicle and the bus although the difference is not significant. The performance of the connected bus system is evaluated and verified.

Keyword：driving simulation; safety; fuel saving; connected bus; freeway.