

Development of Fuzzy-Based Bus Rear-End Collision Warning Thresholds Using a Driving Simulator

張建彥, Ying-Ru Chou

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Abstract

The purpose of this study is to develop rear-end collision warning thresholds with appropriate value of parameters for bus driving on freeways. Based on a bus driving simulator, we design a simulation scenario of car-following with emergency braking on freeways. Bus drivers working in a bus company are recruited to manipulate the simulation. Perception-reaction time, braking deceleration rate and buffer of bus drivers' responses to a lead vehicle suddenly braking are collected and analyzed as parameters. Results indicate that not all the subjects have the same value in each parameter. Hence the value of parameters in bus rear-end collision warning threshold equations should differentiate for various bus driving characteristics. This work further uses a fuzzy set theory to develop the safety membership function of each parameter and deduces twenty-seven warning threshold equations. By these threshold equations, a rear-end collision warning algorithm for bus driving on freeways is also recommended.

Keyword : Bus, Driving Simulator, Freeway, Parameter, Rear-End Collision Warning Threshold.