

大客車縱向防撞警示系統之開發與實測分析

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摘要

“Advanced Safety Vehicle” is one important developing area of the Intelligent Transportation Systems (ITS). Because of the high frequency and severity of bus accidents in recent years, the development of the “Advanced Safety Bus” (ASB) is getting more important in Taiwan. However, if we do not analyze the bus driving behavior and driving safety factors while designing the control and safety systems of the ASB, the systems will misunderstand the traffic condition and provide bus drivers with inappropriate messages or operations, and thus the drivers will lose their confidence in the systems. This study planned and designed several driving simulation scenarios on freeway straight-road sections by utilizing a fix-based bus driving simulator. Bus drivers with license that worked in freeway bus companies were invited to conduct the experiments with the designed scenarios. After experimental data collection and analysis, this study combined the fuzzy theory and the forward collision warning equations to develop twenty-seven safety levels of warning distance equations which include the various safety membership functions of perception-reaction time, braking deceleration and buffer. The related rules were also developed to be a useful basis in developing the forward collision warning system (FCWS) of the ASB. This study finally designed a FCWS program and integrated some devices such as Doppler radar, range finder camera, digital message processor to establish a prototype of the bus FCWS. A real bus with this prototype was drove on the freeway to verify and validate the feasibility of the calibrated FCWS safety parameters. Results showed the bus FCWS developed by this study can effectively provide safety-distance warning messages. The results of this study will be a useful basis in developing and demonstrating the related systems in the future.

關鍵字：Intelligent Transportation Systems, Advanced Safety Bus, Driving Safety Factor, Bus Driving Simulator, Forward Collision Warning System.