

應用駕駛模擬器建立大客車跟車行為門檻模式之分析

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摘要

It has been over fifty years since the car following theory of microscopic traffic flow model developed. The characteristics of car following driving behavior are the core basis of the car following theory. The analysis of car following driving behavior was limited on the passenger car and motorcycle in the past studies. It is lack of the analysis of bus driving behavior. Since the size of bus is bigger than the passenger car and motorcycle, and the average driving time of bus drivers is longer than the passenger car and motorcycle drivers', the psycho-physical behavior response of bus drivers is usually different from the passenger car and motorcycle drivers' even in the same road and traffic conditions. Therefore, it is necessary to develop the related car following behavior model for the bus driving behavior to provide a basis of bus safety management and advanced collision avoidance warning system development. The main objective of this study is to develop a "psycho-physical behavior threshold model" for bus car following driving on the freeway straight road section and calibrate the related parameters. The calibration data of traditional traffic flow studies was collected by the investigating and real car testing methods. There are usually some safety risk and limitations in utilizing these methods. Therefore, this study planned and designed the driving simulation scenario based on the scenario design flexibility and repeated experimental characteristics of bus driving simulator. The bus drivers with license that are working in freeway bus companies were invited to do the experiments under this designed driving simulation scenario. The car following samples without lane change behavior were collected after bus driving simulator experiments and the parameters were also calibrated to develop the bus "psycho-physical behavior threshold model". The psycho-physical behavior threshold equations include "stationary vehicle spacing" equation,

“desired minimum following distance” equation, “maximum following distance” equation, “perception threshold of speed difference at long distances” equation, “perceptual threshold for recognizing small speed differences at short and decreasing distances” equation, “perceptual threshold for recognizing small speed differences at short and increasing distances” equation. The results of this study can effectively describe the bus car following driving behavior on the freeway straight road section. In addition, they can also be a basis of the bus safety spacing regulations and rear end collision warning systems development.

關鍵字：Bus, Psycho-Physical Behavior Threshold Model, Driving Simulator.