A Dynamic Vehicle Anti-collision Warning Model Algorithm and Simulation
TENG, Fei; ZANG, Liguo; YIN, Rongdong; HE, Xu; FENG, Ruoyu
School of Automobile and Rail Transportation College, Nanjing Institute Of Technology, China

Key Words
Collision avoidance, Vehicle active safety, Algorithm, Simulation

Research and/or Engineering Questions/Objective
In order to ensure the safety of vehicles, the distance and relative speed of the front target are automatically detected to determine whether the vehicle is in a dangerous state by vehicle active anti-collision warning system. Reliable, accurate and real-time anti-collision algorithm is the core of the research of vehicle active anti-collision system.

Methodology
On the basis of Mazda model algorithm, the algorithm of vehicle collision avoidance warning system is improved. The system is divided into two levels warning distance, a safe warning distance under normal driving conditions, and a safe warning distance under an emergency braking condition. The principle of calculus and dynamics is used to derive the calculation formula of safe warning distance. Some auxiliary coefficients have been added to modify the safe warning distance. Matlab is used to simulate the safety early warning distance under two conditions, and check the algorithm of the school nuclear collision warning system.

Results
The simulation results show that the safe warning distance required under normal driving condition is larger than that required under the emergency braking condition. The faster the relative speed, the more obvious the effect is, and the improved model can meet the demand.

Limitations of this study
The front and rear vehicles constituting the anti-collision warning model, reliable vehicle movement information needs to be guaranteed. In different working conditions, the actual safe warning distance and theoretical value can be in a certain range of errors.

What does the paper offer that is new in the field including in comparison to other work by the authors?
The anti-collision warning system takes a graded warning system. Normal condition of security early warning distance is used to alert the driver of the speed. Emergency braking conditions of safety early warning distance is mandatory braking distance, is used to guarantee the safety of the vehicle under emergency braking.

Conclusions
The proposed dynamic collision warning system can guarantee the safety of vehicles under multi-working conditions.