Assessment of Pedestrian Friendliness of a Vehicle Using Subsystem Impact Tests

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ABSTRACT

Annually, thousands of unprotected pedestrians are killed or suffer serious injuries in accidents with moving vehicles. Numerous automobile organizations have researched on pedestrian safety. Many approaches have been developed. The European Enhanced Vehicle-safety Committee (EEVC), Working Group 17 (WG17) proposed three component subsystem tests, a passive method, to evaluate the friendliness of vehicle to pedestrian: the legform to bonnet test, the upper legform to bonnet leading edge test, and the headform to bonnet top test. So far, this method has been developing. The first objective of this study is to build the EEVC/WG17 pedestrian impactor models, including child headform, adult headform, upper legform, and legform. Then, EEVC/WG17 regulations are used to validate these models. The second objective is to use validated models to evaluate the frontal structure of a specific vehicle to see if it passes EEVC/WG17 safety requirements. Also, from simulations, some comments about vehicle frontal structure that cause pedestrian injury in car-pedestrian accidents were drawn out. The third objective is to redesign some areas of a vehicle (engine room and bumper) that would affect pedestrian injury to investigate its structure. All simulations were performed through LSDYNA3D. The FE pedestrian impactors built in this study can be used to evaluate pedestrian safety of FE vehicle models during designing as well as available ones. Moreover, the suggestions drawn out from simulation results can help vehicle manufacturers with vehicle design that would be safer to pedestrian.

Keywords : Pedestrian safety ; subsystem test ; pedestrian impactor

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