Proposal of an Electro-Mechanical System to Reduce the Fatality of Car Underride Crashes

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Research and crash data show that rear-end crashes in which heavy-duty vehicles are involved frequently cause severe injuries and deaths in cars and light commercial vehicles. Therefore, a barrier system that will work with the car's active safety system and which could easily be applied on most of the automobiles has been designed to prevent deaths and possible material damages. The system is a special hood which consists of two layers. The outer layer is an energy-absorbing material and the inner layer is made out of metal. The airbags are located between these layers. Before the crash, airbags deploy and open the outer layer from back to front. In order to test the proposed system, three test platforms and a computer crash simulation have been made. Following these tests, the design of the system has been finalized. Conducted tests show that cars with the proposed electro-mechanical system could easily protect the passenger compartment of the vehicle. Distance between the trailer and passenger compartment was measured in these tests. In the tests of car with the developed system, substantial improvement in this distance was observed compared to the control group car. This study showed that with only mounting this barrier system on the automobile, mortality of underride crashes can easily be reduced. Also, this is the first research study in the world literature to address this problem by developing a safety system on car.

Awards Won:

IEEE Foundation: The IEEE Foundation Presidents' Scholarship Award of $10,000

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