Development and Analysis of Curtain Airbag Numerical Model

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ABSTRACT

As the accident of side impact increases and in order to raise the requirement of safety of occupant, the side airbag will become one of the best equipments of passive safety of vehicle. To efficiently design a safe airbag system, the discussion and analysis of the effect of deployment of airbag and relative parameters on safety of occupant must be implemented. Thus, the injury of occupant during vehicle impact can be reduced. Moreover, effectively use CAE techniques to study vehicle impact can increase the quality and efficiency of product development. Therefore, to construct the research and development energy of CAE techniques on protection equipment of passive safety in vehicle side impact, side curtain airbag was investigated in this study. First, the numerical model of curtain airbag was constructed according to the design procedure of CAE. The safety of curtain airbag was estimated according to FMH of FMVSS 201U, and the effect of parameters, such as type of cushion, thickness and mass flow rate of inflator on safety protection of occupant were investigated. At last, model of side curtain airbag mounted on Ford Taurus was designed. The rigid pole test and simulation of full-scale model of vehicle was implemented according to FMVSS 201P, and the dynamic behavior between curtain airbag and dummy and protection performance of head were estimated. Also, the suitable design of mass flow rate of inflator of curtain airbag and thickness of curtain airbag were implemented to provide information for research and development of side curtain airbag.

Keywords : Side impact, curtain airbag, FMVSS 201, free motion headform test, rigid pole test, LS-DYNA

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