[TITLE]

Investigation of seat modeling for sled analysis and seat comfort analysis with J-SEATdesigner

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[ABSTRUCT]

Recently vehicle model is becoming more detailed and complex. Due to refinement of vehicle model, automotive companies are demanding to directly evaluate dummy injury criteria in crush analysis. To evaluate injury criteria, more detailed seat model is needed, because injury criteria are highly depending on seat structure and restraint system. Seat structure consists from metal frame, form pad, covering fabric and complex mechanism. Especially, residual stress in form pad and covering fabric coming from their assembling process is not negligible for direct injury criteria evaluation. The residual stress is also important for seat comfort evaluation. However engineer needs to make big effort to take the residual stress in their seat models into account.

We have been developing new integrated seat design system named J-SEATdesigner. The concept of J-SEATdesigner is to provide big benefit for the seat design related engineer to resolve their issues. In July 2014, we released first version which is dedicated on automation for sled model assembling process. Toward the next release, we have been developing new tools on J-SEATdesigner to make more detailed and complex seat model easily and efficiently.

In this paper, our investigation for detailed seat modeling and introduction of new seat modeling tools on J-SEATdesigner will be shown. Regarding the seat modeling investigation, the seat covering processes simulation from two dimensional fabric cutting pattern has been evaluated and we will propose efficient approach for seat covering process. As new tool application on J-SEATdesigner, effect of residual stress in seat model on sled analysis and seat comfort analysis with human FE model (THUMS) will be discussed.