UNIVERSITI TEKNOLOGI MARA

EXPLOITING HIGH-SPEED AIR BAG MODELS TO QUANTIFY RELIABILITY IN NON-DESTRUCTIVE EVALUATION

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AUTHOR'S DECLARATION

I declare that the work in this proposal was carried out originally with my own work otherwise indicated or acknowledged as a reference work.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA regulating the conduct of my study and research.

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ABSTRACT

The combination between high speed loading with Out of Position (OOP) of airbag are still not well understood though for high precision such as racing car, and others which could lead to the wrong deployment angle and catastrophic failure to the airbag housing. Rather than relying on the old design of airbag housing structure, the cooperation of high speed finite element with the addition of hinge features is an emerging strategy to achieve the required robust structure of airbag housing design. Here, we describe that the high value of strain rate during the high speed airbag deployment can altered by making a modification to the structure instead of using the sharp corner that could lead to the wrong angle of deployment by prepared the four variable of hinge design, as demonstrated by the design of airbag housing with hinge and without hinge in the method. The high speed of airbag deployment towards the housing resulting the high value of strain and different contact result. These result were study on the different design structure in order to overcome the fracture of airbag housing and wrong angle of deployment that lead to Out of Position (OOP). The airbag housing design with hinge exhibit low strain value about 0.0129 where the value is below than strain of Thermoplastic Olefin (TPO) material 0.069 which indicate the robust structure that will prevent the failure of airbag housing. While, the airbag design with no hinge exhibit higher of strain value about 0.0731 than 0.019 for Polypropylene (PP) combined with Ethylene Propylene Diene Monomer (EPDM) for design with no hinge. After the topology result, the high response displacement of structure was reviewed in order to remain the needed structure by removing the unnecessary material during the responses.

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