DEVELOPMENT OF CRASH BOX FOR RACING APPLICATION

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"I declare that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any degree."

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ABSTRACT

Racing car safety is one of the major research areas in automotive engineering. Currently, the racing car is developing safety systems to protect driver upon the collision during racing competition. Practically, computational crash simulations were used to reduce the development and testing costs of a new safety design in the early of evaluation of impact test. The aim of this research are to design a set of impact crash box in numerical simulation by using Finite Element Methods (FEM). The design was validated by comparing to other researcher work that performed crash analysis on circular aluminium tubes. The study proposed a crash box that will be installed to the formula student car. The crash box was simulated by varying the geometry, material and dimension of the crash box. The DOE method is used to determine number of simulation to be run and the optimal impact energy and deceleration was completed using the optimization method. The results obtained show that the impact of crash box is able to absorb the impact energy and plastic deformation with the maximum deceleration is recorded as 30.19 g. All initial requirements were set in accordance with the 2017-18 Formula SAE Rules. The final result of this research were oriented to get optimal values specific energy absorption during the frontal impact, with the lowest maximum deceleration and the initial maximum crash load.

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