ABSTRACT

Higher demand to ensure higher safety standards in vehicles, leading to numerous research on collision energy absorbing mechanisms to protect passengers in vehicles. Thin wall tube structures are widely used in the world of engineering, especially in the automotive field for the application of crash tube as energy absorber. Structural geometry in thin-walled tubes is the most influential factor in crashworthiness, there are many variables to obtain values in structural geometry such as cross-profile profiles, width and thickness require a lot of experiments to get the optimal value. with mathematical models, Response Surface Methodology is able to solve problems by using mathematical models. The objective of this research is to optimize the design of thin-wall tube structural geometry on crash tubes in the Utility Task Vehicle to increase specific energy absorption capacity in the context of crashworthiness using RSM model compared to existing case studies. Furthermore, the results of this study are expected to be useful for developing the customized vehicle industry capacity on the side of knowledge and design ability to produce a safer frame structure from collision. Based on specific energy absorption for the crash tube component on UTV, hexagonal profile tubes with 2.25 mm thickness and 80 mm width can increase specific energy absorption capacity of 64.64% from case studies.

keywords: *Crashworthiness, Thin walled tube, Energy absorption, frontal crash, Response Surface Method.*