

ABSTRACT

The mechanism of a rollover accident is one of the many events that causes severe injury to passengers. One of the factors that can affect the severity of passenger injury when a rollover is occurring is that less space in the driver's compartment due to the structure on the roof of the vehicle is not able to absorb enough energy during collisions. Crashworthiness testing can be done in order to review this. The shape of the geometric structure is one of the factor that plays a role in the absorption of energy in the structure. In this study an experiment was conducted to optimize geometry design on the roof structure of the vehicle in order to have good energy absorption capabilities. The object used in this study is the roof structure of UTV vehicles made by Telkom University. The Taguchi method and finite element method (FEM) were selected in this study because they were able to support the experiments that were to be carried out. The most optimum point after the experiment completed is the thickness factor at level 1 with a value of 1 mm, diameter at level 3 with a value of 40 mm and material at level 1, namely stainless steel C850. Based on this study, the thickness design parameter has a significant effect on the value of energy absorption (EA) and also its weight. The specifications produced from the combination of these three factors result in an increase in the EA value and a decrease in the component weight of the existing specifications.

Keyword: Rollover, UTV, crashworthiness, energy absorption, Taguchi method, FEM