SUMMARY

Zumrotul Ida, Departement of Mechanical Engineering, Faculty of Engineering, University of Brawijaya, July 2016, Analysis of Deformation Pattern and Energy Absorption of Initially Folded Crash Box with Length to Thickness Ratio Subjected to Frontal Crash Test Method, Academic Supervisior : Moch. Agus Choiron dan Anindito Purnowidodo.

The development of modern society has increasing human requirement about transportation. Unfortunately, as increasing the number of vehicles, the number of collisions has also increased. Therefore, improving standards of safety in vehicles is a must. Crash box is one of the passive safety components in a motor vehicle used to absorb impact energy due to collisions, resulting in plastic deformation. The aims of initial fold crash box is to facilitate folding during the crash.

The numerical simulation of the crash was done by Ansys 14.5 academic software. Through numerical simulation of 9^{th} models, the obtained result was used to optimize the design of crash box. The variations in this study were length to thickness ratio of crash box with length of tube (L) = 115 : 132.5 : 150 mm and the thickness of tube (t) = 1.6 : 2.0 : 2.5 mm. Mild Steel is assumed as Bilinear Isotropic Hardening material. The velocity used in the simulations was 7.67 m/s with impact mass of 103 kg.

From the results, 1^{st} model to 8^{th} model has Concertina mode of deformation pattern while the 9^{th} model has Diamond mode. The 3^{rd} model has the largest energy absorption with value 9,459.24 Joules.

Keywords : Deformation pattern, Energy absorption, Length and Thickness, Initial Fold, Crash Box