

ABSTRACT

Innovations in technology development, especially in vehicles where frames require lightweight structures and greater energy. The design of bionic tube structures in the form of spider webs, with the concept of biomimicry. Obtained with theories or concepts that exist in nature, discuss life, conditions, and adaptations. In this case, the spider-web will be selected according to the concept for analysis on the tube structure. Functions of spider-web are how the spider can produce spider-web with a hexagonal pattern which will help them survive. Experimental modeling and testing are carried out using a single-cell with multicellular columns. The goal is to study the simulation results on the tube energy absorber and conduct experiments to compare the results of the design. The next development to be carried out is the optimization of multicellular structures using the Taguchi method. Taguchi's design parameters are important for producing robust designs that enhance products and processes that are very sensitive to variations, by experimenting 27 times. For the results, announced on multicellular structures have the most optimal results where some several factors and levels influence the results of this variation, the optimal parameters generated are level 3 in hexagonal and 2 mm as the thickness of the tube.

Keywords: energy absorption, biomimicry, taguchi method, finite element method, ANOVA.