ABSTRACT

The frame is the most vital part of a vehicle that supports the entire load of the vehicle. In this final project, the frame construction design of an electric vehicle with a rider weight of 200 Kg is carried out. The safety factor value is obtained through the stress analysis feature with Autodesk Inventor Professional Software.

The prototype design concept was taken from the dimensions of the Arcimoto FUV vehicle. The analysis process is carried out by processing the load data supported by the electric vehicle frame. The use of Autodesk Inventor Professional software because there is a frame generator feature, this feature makes it easy to build frames and analyze the strength of electric vehicle construction.

Based on the design analysis results, the overall dimensions of the frame are 2641 x 698.74 x 1539 mm. The test results with the stress analysis feature obtained a safety factor of 5.05 for vehicles without a driver and a safety factor of 2.36 for a driver's load of 200 Kg. The safety factor number in the electric vehicle frame construction test has a safety factor value of 2, so this vehicle frame construction model is safe to use.

Keywords: Design, Analysis, Frame, Autodesk Inventor Professional

INTISARI

Frame merupakan bagian terpenting dari sebuah kendaraan yang menumpu seluruh beban kendaraan. Dalam tugas akhir ini, dilakukan perancangan kontruksi *frame* kendaraan listrik dengan berat pengendara 200 Kg. Nilai *safety factor* diperoleh melalui fitur *stress analysis* dengan *software Autodesk Inventor Professional.*

Konsep perancangan *prototype* diambil dari dimensi kendaraan Arcimoto FUV. Proses analisa dilakukan dengan mengolah data beban yang ditumpu oleh *frame* kendaraan listrik. Penggunaan *software Autodesk Inventor Professional* dikarena terdapat fitur *frame generator,* fitur ini memudahkan pembuatan rangka dan menganalisa kekuatan kontruksi kendaraan listrik.

Dari hasil analisa perancangan diperoleh dimensi keseluruhan *frame* yaitu 2641 x 698,74 x 1539 mm. Hasil pengujian dengan fitur *stress analysis* diperoleh *safety factor* 5,05 untuk kendaraan tanpa pengendara dan *safety factor* 2,36 untuk beban pengendara 200 Kg. Angka *safety factor* pada pengujian kontruksi *frame* kendaraan listrik memiliki nilai *safety factor* ≥ 2, maka model kontruksi *frame* kendaraan ini aman digunakan.