# *STRENGTH ANALYSIS OF THREE-WHEEL ELECTRIC COMMERCIAL VEHICLE FRAME USING SOFTWARE SOLIDWORKS 2021*

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## ABSTRACT

*This research analyzes the frame design of a Three-Wheeled Electric Commercial Vehicle using Solidworks 2021 Software involving the Finite Element Analysis method to determine stress values, displacement values and safety of factor values. The aim of this research is to test the strength of frames from two different materials, namely, Carbon Steel ASTM A36 and Carbon Steel AISI 4130 which are loaded with static loads at the same design and force magnitude. The results of the frame strength analysis for Carbon Steel ASTM A36 material with the assumption of a first static load of 2000 N on the seat tube and 8000 N on the load body showed a maximum stress value of 54.12 MPa, a deflection value of 0.670 mm and a safety factor of 4.6. while for the second static load of 3000 N on the seat tube and 12000 N on the load body, a maximum stress value of 84.93 MPa, a deflection value of 1.003 mm and a safety factor of 2.9 were obtained. For the Carbon Steel AISI 4130 material, assuming the first static load, the maximum stress value was obtained at 58.41 MPa, the deflection value was 0.654 mm and the safety factor was 7.9, while for the second static load the maximum stress value was obtained at 87.62 MPa, a value deflection of 0.981 mm and safety factor of 5.2. In this research, the most appropriate material for the application of three-wheeled electric commercial vehicle frames is Carbon Steel ASTM A36 because its value has been included in the planning criteria, while Carbon Steel AISI 4130 is more suitable for equipment with heavier loads.*

***Keywords:*** *Stress, Displacement, Safety Of Factor.*