ABSTRACT

I Gusti Made Aditya Chandra, 22419860

ANALYSIS OF STATIC AND DYNAMIC LOADS IN DESIGN CHASSIS SOLAR ELECTRIC CAR CAPACITY 50 KG

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(xvi + 65 + Attachments)

Solar energy can be used as a form of renewable energy that has the potential to provide the world's current energy consumption needs for a longer time. One vehicle that is made using renewable energy is a solar electric car, which is a type of electric vehicle that uses solar energy as its energy source. This research will discuss the design of solar electric cars, static load simulations and dynamic loads on them chassis solar electric car with a capacity of 50 kg. The research methodology used to create scientific research reports is to collect data during the research by means of literature studies and analysis studies. Testing and analysis is carried out through software software solidworks 2022. Simulation results of the static load on a solar electric car with a capacity of 50 kg by providing the first load, namely at driver car that has a mass of 600 N, the second load is on the mass of goods to be transported by a car with a mass of 500 N, the third load is on chassis the rear part that supports the bldc electric motor, solar charge controller, controller bldc electric motor, battery, calipers, and shock breaker with a total mass of 82.8 N, the fourth load is a solar panel with a mass of 118 N. Simulation results von mises stress $156.2\,N/mm^2$ and the theoretical calculation is $157.74\,N/mm^2$, simulation results displacement is $16.7\,mm$ and the theoretical calculation is $16.76\,mm$, and simulation results safety factor is 1.30 and the theoretical calculation is 1.31. Then the dynamic load simulation results on a solar electric car with a capacity of 50 kg von mises stress maximum of $5.127\times10^7 N/m^2$, dispalcement maximum of $9.58\times10^{-2}\,mm$, and safety factor minimum of 4.03. Then graph the dynamic simulation results with fluctuating movements for 6 sec linear displacement by 33 mm on time 5.00 sec, Velocity of 46 mm/s at time 4.50 sec, acceleration of 183 mm/s^2 on time 4.90 sec, and force amounting to 3744 N at time 5.00 sec. This is due to giving force amounting to 720.8 N to shock breaker Solar electric car has a capacity of 50 kg, with a range of ups and downs shock breaker by 28-35 mm for 6 sec.

(Bibliography 1966-2022)
Supervisor : Dr. RR. Sri Poernomo Sari, ST., MT