

Loading Analysis and Detailed Engineering Design of Solar Cell based RC Boat Trash Collector.

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ABSTRACT

Solar power plants (PLTS) are electricity generation systems that convert solar energy into electrical energy. The application of PLTS technology to the 2023 PKM-KC team of Jember State Polytechnic's 2023 Solar Cell-based RC Boat Trash Collector is by designing an Off-Grid system with a capacity of 15 Wp where the resulting energy is stored in the battery as motor driving energy totaling 3 units with a breakdown of 2 units as a driving motor and 1 other unit as a conveyor driver. The aim of this research is to determine the load analysis of the 15 Wp Off-Grid PLTS, to find out the detailed engineering design and the results of the feasibility test of the RC Boat Trash Collector. This research is divided into several stages, namely: data collection, data processing, design and design simulation and drawing conclusions. This research was conducted on the Bedadung River, Tegal Gede Village, Sumbersari District, Jember Regency. Based on feasibility study research and detailed engineering design on the RC Boat Trash Collector, it was found that the power produced by the solar panels was: 54 Wh, Total battery power: 39.6 W, Irradiation (W/m^2): 618.0 W/m^2 , Total charging 2 hours 17 minutes, which is based on the results of calculating solar cell needs and calculating battery charging. By accumulating mathematical calculations, from this it can be declared suitable for operation and the simulation results of the frame or hull design and the stability of the ship's hull on the RC Boat Trash Collector can be operated for a long period of time or it can be concluded that the service life is classified as suitable for use.

Keywords: Loading analysis, Detailed Engineering Design, RC Boat Trash Collector, Off-Grid, Solar Power Plant