

**DESIGN OPTIMIZATION OF THE "ARGOPURO" PROTOTYPE CAR  
BODY FOR ENHANCED AERODYNAMICS PERFORMANCE  
TURN ANSYS 2024 R1**

*Ir. Dicky Adi Tyagita, S.T., M.T. As Chief Counselor*

***Kaisar Fatur Rahman***

*Study Program of Automotive Engineering, Majoring of Engineering*

*Politeknik Negeri Jember*

**ABSTARCT**

*This research aims to analyze the aerodynamic performance of the Vehicle Argopuro prototype vehicle body design using ANSYS Fluent. Two body designs, the old and the new, were tested through Computational Fluid Dynamics (CFD) simulations. The parameters observed include frontal area, drag coefficient ( $C_d$ ), Drag Force, lift coefficient ( $C_l$ ), Lift force, pressure distribution, and airflow velocity under varying speeds of 20 km/h, 40 km/h, and 60 km/h. Simulation results show that although both designs have the same frontal area ( $0.4 \text{ m}^2$ ), the new body design produces a significantly lower drag coefficient, at 0.1159 compared to 0.2917 for the old design. The Drag Force decreased by up to 63%, while the  $C_l$  value became more negative, indicating a 34% increase in downforce. Pressure and velocity distributions also showed that the new design allows smoother and faster airflow along the body surface. Overall, the new body design proves to be more aerodynamically efficient and supports better energy efficiency and stability at various speeds.*

**Keywords:** *aerodynamics, ANSYS Fluent, CFD, Drag Force, Lift force, vehicle body design*