STUDI NUMERIK PENGARUH KECEPATAN KERETA CEPAT INDONESIA - CHINA "WHOOSH" TERHADAP DINDING BANGUNAN PADA S/H 1,63

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ABSTRACT

This study discusses the effect of the speed of the Indonesia–China High-Speed Railway "Whoosh" on pressure distribution and airflow around a wall structure with an S/H ratio of 1.63 using the Computational Fluid Dynamics (CFD) method. The simulation was conducted using ANSYS Fluent 2021R2 with a two-dimensional (2D) model and speed variations of 70 m/s, 83 m/s, and 97 m/s under wall and no-wall conditions. The analyzed parameters include drag coefficient (Cd), pressure coefficient (Cp), static pressure, as well as velocity and pressure contours.

The results show that higher airflow velocity causes greater changes in pressure distribution and flow patterns. Under wall conditions, airflow acceleration (nozzle effect) occurs, resulting in larger negative pressure and turbulence compared to the no-wall condition. In addition, the drag coefficient value under wall conditions is higher due to increased air resistance. Maximum pressure occurs at the front of the train because it is a stagnation point, while low pressure occurs at the sides and rear due to flow acceleration and flow separation.

Based on the simulation results, the presence of a wall beside the railway significantly affects the aerodynamic characteristics of the high-speed train, especially in terms of pressure distribution, turbulence, and aerodynamic drag. This study is expected to serve as a reference for designing structures around high-speed railway tracks to improve safety and efficiency.

Keywords: *CFD, Whoosh high-speed train, aerodynamics, static pressure, drag coefficient.*