

Abstract Submitted
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Effect of moving ground and rotating wheels on the flow over a high speed passenger train MOHAMMAD ASIF SULTAN, DIBYENDU KONAR, Research Scholar, Indian Institute of Technology Kharagpur, SUBHRANSU ROY, Professor, Indian Institute of Technology Kharagpur — High speed passenger trains are gradually coming up successfully as a mode of modern transportation. The impact of moving ground and rotating wheels on the flow around a high speed train has been numerically investigated. A Reynolds number of 1.85×10^6 based on the air flow velocity and height of the train is used in the CFD modelling using *k-epsilon* turbulence model. The total aerodynamic drag were calculated for the three cases: stationary ground, moving ground, moving ground with rotating wheels. Moving ground boundary condition is found to eliminate the boundary layer near the ground which affects the flow beneath the train and changes the pressure distribution. The rotating wheel boundary condition tends to increase the velocity of flow in the bogie region. With moving ground, there is 10.2% increment in the total drag which further increases by 1% when rotating wheels are considered. The simulations show that bogies also have a major contribution on the total drag. It is around 15.2% with stationary ground, increases to 22.8% while ground is moving and finally attains 25.1% when the most realistic case of both moving ground and wheel rotation is considered.

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