Title:

**NUMERICAL SIMULATION ON THE ELUCIDATION OF WAKE FLOW STRUCTURE BEHIND A SINGLE QUARTER ELLIPTIC-WEDGE SPIRE**

Author: Muhammad Arifuddin Fitriady1,3\*, Nurizzatul Atikha Rahmat1\*, and Ahmad Faiz Mohammad2

1 Faculty of Mechanical and Automotive Engineering Technology, Universiti Malaysia Pahang (UMP), Malaysia

2 Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia (UTM), Malaysia

3 Research Center for Chemistry, Nasional Research and Innovation Agency (BRIN), Indonesia \*arifuddinK46@gmail.com and izzatulatikha@ump.edu.my

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Abstract

A study to investigate the wake flow structure behind a single spire, which imitate a skyscraper, and its aerodynamic interaction with the smooth wall boundary layer based on CFD by utilizing OpenFOAM® with the k-ε turbulence model has been conducted. The lateral velocity profile as well as the derivative analysists, i.e. the velocity deficit, the half wake width, and the maximum velocity deficit, are discussed in detail. It was found that the lateral velocity profile of the current study is in good agreement with the previous WT experimental data. The turbulence generated by the spire has the capability to preserve the wake flow against the recovery process both in vertical and streamwise directions. Furthermore, the distance required by the wake flow to be fully recovered is estimated to be around 40S in the streamwise direction. Finally, it can be concluded that the flow structure above the BLH specified as a typical 2D wake of a bluff body in a free stream for the near wake region only

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