

Use of the Discrete Vortex Method to Calculate Wind Loads over a Surface-Mounted Prism and a Bridge Cross-Section with Flaps

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(ABSTRACT)

This thesis aims at presenting the Discrete Vortex Method (DVM) as a tool to determine the flow field and associated wind loads over structures. Two structures are considered: the first is a surface-mounted prism and is used to simulate wind loads over low-rise structures. The second is a bridge section with attached flaps that can be oriented to vary the moment coefficient. Advantages and disadvantages of using DVM for these applications are discussed. For the surface-mounted prism, the results show that the developed code correctly predicts the flow separation around the corners. As for the surface pressures, it is concluded that parallel processing, which could be easily implemented for DVM, should be used to correctly predict surface pressures and their variations. This is due to the required slow time advancement of the computations. The results on attaching flaps to bridge sections yield required orientations to minimize moments under different angles of attack.

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