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A New Method in Measuring the Velocity Profile Surrounding a Fence Structure Considering Snow Effects

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Abstract: In this paper, a new method is proposed to measure the air velocity profile around a fence structure with consideration of snow effects. This includes the consideration of snow particle size and its distribution. In this method, a simple wind tunnel powered by a fan was utilized to generate the wind for outdoor test. Considering drifting snow particles might cause damage to the equipment, different materials with different surface roughness height are introduced to simulate the influence of drifting snow particles on boundary layer of velocity profile. According to the test and analysis, the materials with 0.1cm-3cm surface roughness height can adequately characterize the effect of drifting snow particles on boundary layer of velocity profile. The snow depth distribution measured in this study agrees well with the reference value reported in the previous research. The measurement method proposed in this paper can be employed for further snow drifting tests while the wind tunnel is not needed in the experiment.

Keywords: outdoor test, simple wind tunnel, velocity profile, drifting snow particles, boundary layer, snow distribution pattern

1 Introduction

Drifting snow is typically a notable risk which could reduce the visibility of a driver and cause road accidents. It is necessary to consider snowdrift formation in snow loading analysis. Many former studies have been conducted on the phenomenon of wind induced snow drifting through field investigation, theoretical analysis, wind tunnel test and numerical simulation. Among these, field investigation is the most direct analysis method which could provide the most realistic information for snow loading analysis. Therefore, field investigation is one of the most important

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