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Bed roughness effects on characteristics of turbulent confined wall jets

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Abstract

In this paper, effects of bed roughness on the flow pattern and turbulence characteristics, such as velocity contours, shear stresses, Reynolds stresses and turbulence intensities on a three-dimensional wall jet were investigated experimentally. The experiments have been conducted in a channel which is made of metal floor and glass walls, width 0.57 m, height 1 m and length 10 m. Jet was settled using a pipe with internal diameter of 20 mm over a horizontal bed. A velocimeter was used to measure the flow velocity at three directions. The time-averaged values of velocities were used to calculate the turbulence characteristics. The results showed that with increasing surface roughness, the rate of growth length of longitudinal scale decreases, while decay rate and jet velocity increases. Moreover, the maximum value of turbulence intensity is

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