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**Numerical simulation of a turbulent wall jet in a rough-bed open channel**[1] JOONGCHEOL PAIK, Gangneung-Wonju National University, FABIAN BOMBARDELLI, KEN LOH, University of California, Davis — Numerical results of the mean flow and turbulence characteristics in the near field of a turbulent plane wall jet issuing from a sluice gate onto a rough flat wall are presented. The flow had been experimentally investigated by Albayrak et al. [I. Albayrak, E.J. Hopfinger and U. Lemmin, J. Fluid Mech., 606, 27, (2008)] at the Reynolds number of 33,500 and the Froude number of 1.014, based on the jet velocity and the sluice gate opening height. Turbulent flow is simulated using the $k$-$\omega$ shear-stress transport (SST) model and the scale-adapted simulation (SAS) based on the SST model. The jet velocity profile is numerically reproduced based on the difference of upstream and downstream water levels computed by the volume of fluid method. The numerical results show that the outlet boundary should be carefully treated to successfully reproduce the velocity profile approaching the shape of the typical open-channel flow downstream of the attachment point of the jet. Numerical solutions appear to agree reasonably well with the measurement in terms of the outer-layer spatial growth rate and Reynolds stress distributions. The mesh convergence of numerical solutions is also presented.

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Joongcheol Paik
Gangneung-Wonju National University

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