

Estimation of Bed Form Friction Coefficients using ADCP Data

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Abstract

Bed shear stress is important variable in river flow analysis. The bed shear stress has an effects on bed erosion, sediment transport, and mean flow characteristics. Quadratic formula to estimate bed shear stress is widely used, $\tau = \rho c_f u |u|$ in which friction coefficient, c_f , needs to be assigned to numerical models.

The aim of this study is to estimate Chezy coefficient using bathymetry data measured by ADCP. Bed form geometry variables will be estimated form bed profile, then Chezy coefficient will be determined using estimated bed form geometry variables in order to set friction coefficient to numerical model. From the probability density function obtained from the bathymetry data, Chezy coefficient will be randomly generated since Chezy coefficient is not uniform over the space and it does not depend on spatial variables such as water depth and distance from river bank. Numerical test will be performed to find to demonstrate randomly extracted Chezy coefficient is appropriate.

The result of this study is valuable in that the friction coefficient is estimated in consideration of the bed profile, and as a result, uncertainty of the friction coefficient can be reduced.

Keywords : bed form, roughness length, numerical simulation, ADCP

Acknowledgment

This study is supported by a Korea Environmental Industry & Technology Institute (KEITI) grant funded by the Ministry of Environment.

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