

Flow Characteristic Analysis in Meandering Channels by the Numerical Analysis

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The damages caused by floods occur in every river area in the rainy season and these damages impact to human directly and indirectly. Natural shape of river is generally made by flood, and its shape is similar to meandering channels. The flow characteristics of meandering channels are very important in field of river hydraulics that should be studied in practical viewpoints. It related to protection of the river banks, navigations, intakes and sedimentations of soil particles. Velocity distribution in channels also help to solve the problems of energy loss, distribution of shear stress in riverbed. In this study, The model application was reviewed through comparing and analyzing the measuring and analyzed data using CCHE-2D and FLOW-3D models for the experimental channel and natural river(Namgang dam downstream). The models were applied to the natural river having curvature radius of about 1300 to 1600. The results are that the data of water surfaces from 2D model were 3% higher than the data from 3D model and 2D and 3D model were comparably similar to each other because related coefficient were shown as 0.91 in average. Maximum velocity path in the experimental channel occurred in inner side of curve apex. After passing curve apex, maximum velocity line went to the shortest path moving to external side. On the other hand, Maximum velocity path in a natural river occurred along the deepest line. The reason is that the deepest line occurs in the side of external banks. As the analysis results of the water surfaces differences of inner and external side in the cross section of meandering sector in a natural channel, the water surface of an external side of bank is increased to be approximately 2.13% in maximum in comparison with the average water surface. Accordingly, it is essential that river banks having meandering river should be designed considering the increases of water surface and tractive forces in order to secure stability and economic efficiency at once.

References

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