



Basic problems and new potentials in monitoring sediment transport using Japanese pipe type geophone

Saiichi Sakajo

Japan (msqqm372@ybb.ne.jp)

The authors have conducted a lot of series of monitoring of sediment transport by pipe type geophone in a model hydrological channel with various gradients and water discharge, using the various size of particles from 2 to 21 mm in the diameter. In the case of casting soils particle by particle into the water channel, 1,000 test cases were conducted. In the case of casting all soils at a breath into the water channel, 100 test cases were conducted. The all test results were totally analyzed by the conventional method, with visible judgement by video pictures. Then several important basic problems were found in estimating the volume and particle distributions by the conventional method, which was not found in the past similar studies. It was because the past studies did not consider the types of collisions between sediment particle and pipe. Based on these experiments, the authors have firstly implemented this idea into the old formula to estimate the amount of sediment transport. In the formula, two factors of 1) the rate of sensing in a single collision and 2) the rate of collided particles to a cast all soil particles were concretely considered. The parameters of these factors could be determined from the experimental results and it was found that the obtained formula could estimate grain size distribution. In this paper, they explain the prototype formula to estimate a set of volume and distribution of sediment transport. Another finding in this study is to propose a single collision as a river index to recognize its characteristics of sediment transport. This result could characterize the risk ranking of sediment transport in the rivers and mudflow in the mountainous rivers. Furthermore, in this paper the authors explain how the preciseness of the pipe geophone to sense the smaller sediment particles shall be improved, which has never been able to be sensed.