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**Abstract**

**Title: Hydrodynamic parameters of the beginning of the movement of single sediment grains**

The doctoral thesis aimed to carry out the measurements to determine the hydrodynamic parameters of the beginning of the movement of single sediment grains in the hydraulic channel, which belongs to the Faculty of Environmental Engineering and Land Surveying of the University of Agriculture in Krakow. Carefully selected grains of sediment were used in the research. Comparative analysis was performed with the results of other scientists who conducted experiments on empirical formulas in field or laboratory conditions but with different bed sediment. Studies were carried out on the grains of the gravel fraction (2 - 63 mm), which were collected from the Ponikiewka stream. A mechanical shaker sorted bed sediment in the geotechnical laboratory, which belongs to the Department of Hydraulic Engineering and Geotechnics. Each grain was measured, weighed, and its volume was determined. The pebble dimensions were specified in three surfaces: a - length, b - width and c – thickness, which was used to determine the grain shape using the flattening, elongation and spherical indicators according to Sneed and Folk (1958). The research was carried out on a total of 1080 sediment grains. The experiments were carried out on five different beds - smooth, without bottom material, fine (2 - 6.3 mm), medium (6.3 - 20 mm), thick (20 - 63 mm) and mixed (2 - 63 mm) gravel. The Valeport Model 802 electromagnetic mill was used to measure the erosion speed and grain deposition in the hydraulic channel. When the grain movement on the bed was observed, the electromagnetic current meter was moved to the place of the previously placed pebble, and the measurement was made. The measurement time lasted 1 minute - during this time, the grinder was reading about 60 individual measurements of the velocity of the flowing water. The work resulted in the creation of erosion and deposition diagrams of sediment particles, the calculation of individual forces affecting a single grain, and the determination of dimensionless critical stresses and shear stresses. The research follows the experiments carried out by other researchers and cast a new observation on the transport of bed-load in the watercourse beds.

Key words: bedload, hydraulic channel, erosion, deposition, gravel fraction

