Abstract

Erosion and sediment transport in the rivers is one of the most important and complicated subjects in river engineering. These phenomena have specific effects on water quality, bed and bank scouring as well as considerable damages to water related structures and projects. Therefore, precise prediction of river sediment plays an important role in water resources management and planning as well as design and construction of hydraulic structures. According to beshar is a gravel-bed river, in this research it has been tried to obtain the best equation of five well-known bed load transport equations in determination of bed load sediment. Using multi-sample of surface and Substrate bed load sediment of three stations on Beshar River of Kohgiluyeh and Boyer-Ahmad Province has been predicted, and the results have been compared to sediment rating of bed load transport equations. According to the results of plotting and Statistics tests, the equation of Wilcock and Crowe (2003) has presented acceptable predictions in all of stations sediment in comparison to the sediment recorded stations.

Key words: gravel stream, Bed load transport, surface and Substrate layer, Beshar River

1 Introduction

During the last three decades issues related to sediment transport and the structure of channel beds in gravel streams have received considerable attention. and Terms like equal mobility and size-selective transport, pavement and armour layers (surface layer), fractional transport and single-diameter based bed load transport, surface and substrate based analyses have become commonplace in the gravel-bed rivers literature. For obtaining sediment bed load rate of river by experimental equations its necessary that we have some information of Bed River and its it would be impossible to determine this without extensive sampling. Results from field studies and flume experiments suggest that the separation between bed load and substrate grain-size distributions is related to variations in hydrology, boundary shear stress, and/or sediment supply, although these interactions are not very well understood (Barry and others 2004; Buffington and Montgomery 1999; Dietrich and others 1989; Hassan and Church 2001; Hassan and others 2006; Lisle 1995; Mueller and others 2005; Parker 1990a; Pitlick and others 2008; Powell and others 2001; Wathen and others 1995).

we can separate the “sediment system” into three distinct components, as illustrated in Figure 1. The sediment we typically see on the bed surface consists of relatively coarse clasts representing the largest grain sizes carried by the stream or river. Winnowing of finer particles from the bed surface produces a distinct layer with a thickness approximately equal to the diameter of the coarsest grains. This sediment is referred to as the surface layer or armor. The sediment immediately beneath the surface layer consists of a more homogeneous mixture of fine and coarse particles and is referred to as the substrate or bulk bed material. The substrate is generally much finer than the surface layer, and typically 10 to 20 percent of this sediment is finer than gravel (<2 mm). The third component of the sediment system is the bed load itself. This sediment is, by definition, the material that moves in contact with the bed. We can illustrate the differences in sediment characteristics graphically by plotting the distribution of particle sizes as cumulative frequency curves.

Figure 2 presents two examples of grain size distributions based on sediment samples taken in two gravel-bed rivers. Data set includes measurements of the bed load, bed surface layer, and substrate. The diagram on the left shows that the material of substrate layer of Beshar River is finer than the substrate layer.