

On grain roughness in rivers and streams

Robert T Milhous¹

Hydrologist. Fort Collins, Colorado 80526

Abstract. An effective approach to estimate the Manning's roughness in a river is to select a grain roughness value of Manning's n for the bed material and then add other components of roughness to the grain roughness. The grain roughness is represented by the size and shape of the grains of the material that form the streambed. Cross section irregularities, channel alignment, vegetation, obstructions, and other factors that increase roughness and added to the grain roughness. The objective of this paper is to improve on ability to calculate grain roughness in gravel-bed rivers where the grain roughness is represented by Manning's roughness. Equations developed by G.A. Griffiths are considered to be equations that can be used to estimate the grain roughness. A method of estimating grain roughness using quantile regression shows comparable results to the Griffiths equations based on the Griffiths data and another set of data from Northern California. Data from Arizona and New York was also used to develop equations for grain roughness. These equations are very different from the Griffiths equations. A discussion of possible reasons for difference in the different equations for grain roughness is presented.

¹ Hydrologist. Retired US Geological Survey
1812 Marlborough Court
Fort Collins, Colorado USA
Phone: 970 484 9760 Email: r.milhous@att.net