

The XXXVI International School of Hydraulics, 23-26 May 2017, Jachranka, Poland

Flow dependence of the parameters of the transient storage model

S. G. WALLIS¹ and J. R. MANSON²

¹ Heriot-Watt University
Edinburgh Campus, Edinburgh EH14 4AS, UK
email: s.g.wallis@hw.ac.uk

² Stockton University, Applied Physics
101 Vera King Farris Drive, Galloway, NJ, USA

ABSTRACT

Using 25 tracer experiments parameters of the transient storage model (TSM) were evaluated for a reach of the river Brock in north-west England with the primary aim of investigating their dependence on flow rate. Since only a very few previous studies have considered this issue these new results aid our understanding on how the TSM could be applied to a reach at flow rates out-with the range of flow rates for which observations of solute transport exist. Velocity increased with increasing flow rate in a manner consistent with current knowledge. In contrast, and unexpectedly, the dispersion coefficient reduced (weakly) with increasing flow rate and the values were rather scattered. The transient storage exchange rate increased with increasing flow rate, which corroborates some of the sparse existing knowledge of this parameter's behaviour. The ratio of transient storage area to main channel area was essentially constant over the range of flow rates examined, which is consistent with some studies on single reaches.