

Jonkman, S.N., I. Kelman, and V. Bain. 2005. "A Physical Interpretation of Human Stability in Flowing Water". In Proceedings of the International Symposium on Stochastic Hydraulics, International Association of Hydraulic Research, Nijmegen, The Netherlands, 23-24 May 2005.

Abstract:

Several authors have proposed limits for human stability in flowing water in the form of a critical depth-velocity ($h v_c$) product. However, a physical justification for this criterion has received less attention. This paper investigates the physical background of human stability in flowing water. The existing literature clearly identifies two mechanisms that can cause instability: moment instability (toppling) and friction instability. It is shown that the $h v_c$ product has a physical relation with moment instability. The available experimental data is related to these physical mechanisms for instability. Two available datasets have been analysed. The analysis does not reveal a decisive mechanism that causes instability, but it is shown that the combination of moment and friction instability criteria could explain the scatter of and differences in experimental results.