

人工粗糙壁面的水跃特性研究(PDF下载)

《应用力学学报》[ISSN:1000-4939/CN:61-1112/O3] 期数: 2014年02期 页码: 270-274 栏目: 出版日期: 2014-04-01

Title: Characteristics of hydraulic jump on artificial roughened beds

作者: [张志昌](#); [傅铭焕](#); [赵莹](#); [李若冰](#)
西安理工大学 710048 西安

Author(s): [Zhang Zhichang](#); [Fu Minghuan](#); [Zhao Ying](#); [Li Ruobing](#)
Xi'an University of Technology, 710048, Xi'an, China

关键词: [人工粗糙壁面](#); [共轭水深](#); [水跃长度](#); [壁面平均切应力](#)

分类号: TV135.2+1

DOI: 10.11776/cjam.31.02.D014

文献标识码: A

摘要: 根据已有文献对密排加糙壁面水跃共轭水深、水跃旋滚长度、水跃长度的试验结果,分析了密排加糙壁面水跃的共轭水深、水跃旋滚长度、水跃长度、壁面平均切应力随弗劳德数、跃前和跃后断面水深、壁面粗糙度的变化规律;给出了人工粗糙壁面水跃共轭水深、水跃旋滚长度、水跃长度、壁面阻力系数、壁面平均切应力的计算公式;通过已有文献的试验结果对公式进行了验证,得到了水跃共轭水深的平均误差为4.06%,水跃旋滚长度和水跃长度的平均误差分别为4.25%和7.16%。研究表明:人工粗糙壁面水跃的共轭水深和水跃长度随着跃前断面弗劳德数的增大而增大,随着壁面粗糙度的增大而减小;壁面平均切应力随着壁面粗糙度和跃前断面弗劳德数的增大而增大,随着共轭水深比的增大而减小。

[导航/NAVIGATE](#)

[本期目录/Table of Contents](#)

[下一篇/Next Article](#)

[上一篇/Previous Article](#)

[工具/TOOLS](#)

[引用本文的文章/References](#)

[下载 PDF/Download PDF\(429KB\)](#)

[立即打印本文/Print Now](#)

[统计/STATISTICS](#)

[摘要浏览/Viewed](#) 5

[全文下载/Downloads](#) 4

[评论/Comments](#)



参考文献/REFERENCES

- [1] Bradley J N, Peterka A J. Hydraulic design of stilling basins[J]. Journal of the Hydraulics Division, 1957, 83(5): 1-14.
- [2] Narayana N P, Unny T E. Shapes of appurtenances in stilling basins[J]. Journal of Hydraulic Division, 1964, 90(3): 1-21.
- [3] Narayana P N, Goel A, Dubey A K. Hydraulic jump type stilling basin for low Froude numbers[J]. Journal of Hydraulic Engineering, 1989, 115(3): 989-994.
- [4] 闫晋垣. 掺气分流墩设施的研究[J]. 水利学报, 1988(12): 46-50. (Yan Jinyuan. Study on aerated flow by splitting pier [J]. Journal of Hydraulic Engineering, 1988(12): 46-50 (in Chinese)).
- [5] Ead S A, Rajaratnam N. Hydraulic jumps on corrugated beds[J]. Journal of Hydraulic Engineering, 2002, 128(7): 656-663.
- [6] Ead S A, Rajaratnam N. Plane turbulent wall jets on rough boundaries with limited tailwater[J]. Journal of Engineering Mechanics, 2004, 130(10): 1245-1250.
- [7] Abbaspour A, Dalir A H, Farsadzadeh D, et al. Effect of sinusoidal corrugated bed on hydraulic jump characteristics[J]. Journal of Hydro-environment Research, 2009(3): 109-117.
- [8] Carollo F G, Ferro V, Pampalone V. Hydraulic jumps on rough beds[J]. Journal of Hydraulic Engineering, 2007, 133(9): 989-999.
- [9] Pagliara S, Lotti I, Palermo M. Hydraulic jump on rough bed of stream rehabilitation structures[J]. Journal of Hydro-environment Research, 2008(2): 29-38.
- [10] 薛朝阳. 考虑摩阻力影响的水跃方程[J]. 河海大学学报, 1993, 21(2): 109-114. (Xue Zhaoyang. A hydraulic jump equation involving the friction force[J]. Journal of Hehai University, 1993, 21(2): 109-114 (in Chinese)).
- [11] 程香菊, 陈永灿. 波浪形底板上水跃的数值模拟[J]. 水利学报, 2005, 36(10): 1252-1257. (Cheng Xiangju, Chen Yongcan. Numerical simulation of hydraulic jumps on corrugated beds[J]. Journal of Hydraulic Engineering, 2005, 36(10): 1252-1257 (in Chinese)).
- [12] Ead S A, Rajaratnam N, Katopodis C, et al. Turbulent open-channel flow in circular corrugated culverts[J]. Journal

of Hydraulic Engineering, 2000, 126(10): 750-757.

[13] 聂孟喜.陡坡明槽反孤段空化问题的试验研究[J].水力发电学报, 1987, 6(4): 79-88(Nie Mengxi.Preliminary experimental study of roughening bucket for cavitation protection in open flow[J].Journal of Hydroelectric Engineering, 1987, 6 (4): 79-88 (in Chinese)).

[14] Hughes W C, Flack J E.Hydraulic jump properties over a rough bed[J].Journal of Hydraulic Engineering, 1984, 110 (12): 1755-1771.

[15] Carollo F G, Ferro V, Pampalone V.New solution of classical hydraulic jump[J].Journal of Hydraulic Engineering, 2009, 135(6): 527-531.

备注/Memo: -

更新日期/Last Update: