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# Analytical solution of dam-break flood wave propagation in a dry sloped channel with an irregular-shaped cross-section

Bo Wang[a], Yunliang Chen[b], Chao Wu[c], Yong Peng[d]*, Xiao Ma[e] and Jiajun Song[f]

[a]Associate Professor, State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University, Chengdu, Sichuan 610065, China. E-mail: wangbo@scu.edu.cn

[b]Associate Professor, State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University, Chengdu, Sichuan 610065, China. E-mail: 13541291332@163.com

[c]Professor, State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University, Chengdu, Sichuan 610065, China. E-mail: wuchao_w@163.com

[d]Associate Professor, State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University, Chengdu, 610065, China. E-mail: pengyongscu@foxmail.com (Corresponding author)

[e]Master's Candidate, State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University, Chengdu, Sichuan 610065, China. E-mail: 1633553796@qq.com

[f]Master's Candidate, State Key Laboratory of Hydraulics and Mountain River Engineering, Sichuan University, Chengdu, Sichuan 610065, China. E-mail: 450192166@qq.com

**Abstract:** Cross-sectional channel shape is a primary factor influencing dam-break floods. However, it is difficult to analytically understand the impact of the cross-sectional shape on flood wave propagation because most of the existing analytical solutions are only applicable to channels with specific cross-sections (e.g., rectangular, parabolic and triangular cross-sections). Here, a polyline cross-section representing a realistic scenario and derivation method were suggested for analyzing dam-break floods down a dry sloping channel. With the proposed model, the flow depth, average velocity and discharge profiles after an instantaneous dam break can be presented as three dimensionless curves. The effect of bed slope on the dam-break wave was evaluated. Both the flood acceleration on a downward-sloping channel and the flood retardation on an upward-sloping channel are illustrated clearly with the analytical solution in an example application. The effect of the bed

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