Closure to "Multiple Critical Depth Occurrence in Two-Stage Cross Sections: Effect of Side Slope Change" by Ali R. Vatankhah

DOI: 10.1061/(ASCE)HE.1943-5584.0000682

Ali R. Vatankhah[1]

[1]Assistant Professor, Irrigation and Reclamation Engineering Dept., Univ. College of Agriculture and Natural Resources, Univ. of Tehran, P.O. Box 4111, 31587-77871 Karaj, Iran. E-mail: arvatan@ut.ac.ir

The author would like to thank the discusser for providing some comments regarding the multiple-critical depth occurrence in two-stage cross sections. The work by the discusser, related to the more general cases in which the floodplain is rougher than the main channel, and the kinetic energy correction coefficient is variable, adds value to the original publication. The original paper was the first attempt to establish a criterion to describe the multiple-critical depth occurrence in two-stage cross sections. The results presented by the discusser advance the author's approach, and they are necessary to be taken into account in practical applications.

The author would like to add a few points:

Since $Q_* = Q^2/(gH^5)$, thus E_* has a linear relationship with Q_*, and Eq. (2) should be corrected as

$$E_* = 1 + h_* + \alpha \frac{Q_*}{2A_*^2} \tag{1}$$

Eq. (6) should also be corrected as

$$\frac{dE_*}{dh_*} = 1 - \left(\alpha \frac{Q_* T_*}{A_*^3} - \frac{Q_*}{2A_*^2}\frac{d\alpha}{dh_*}\right) = 0 \tag{2}$$

and Eq. (7) should be corrected as

$$\mathrm{Fr}_* = \left(\alpha \frac{Q_* T_*}{A_*^3} - \frac{Q_*}{2A_*^2}\frac{d\alpha}{dh_*}\right)^{1/2} \tag{3}$$

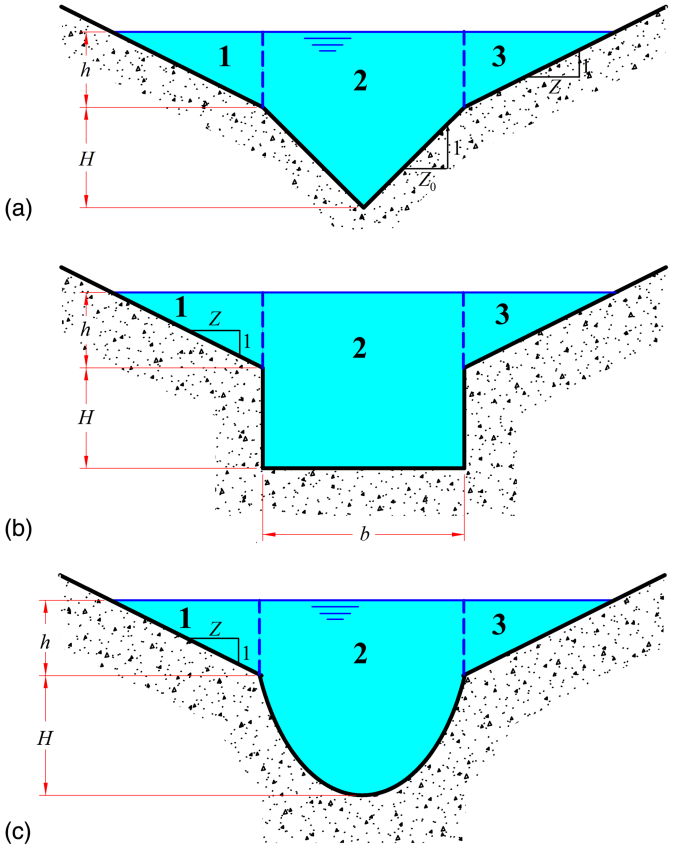

Fig. 1. Compound channels with nonzero lateral slopes and their subsections: (a) compound triangular section; (b) compound rectangular section; (c) compound parabolic section

The discusser has used Q_*^2 instead of Q_* in the above mentioned equations [Eqs. (1)–(3)] which should be corrected.

The subsections 1, 2, and 3 are not shown on Fig. 1 of the discussion. These subsections are shown on Fig. 1 of this closure for better understanding the definition of the kinetic energy correction coefficient.

The numerical values of n_* and Z_0 = constant are not presented in Fig. 2 of the discussion.