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Error analysis of hydraulic radius evaluation in open channel flow hydraulic calculation

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ABSTRACT

Hydraulic radius is an important parameter in hydraulic calculation. But it is often deemed that hydraulic radius can be replaced by the cross-sectional average water depth when the width to depth ratio (B/H) is greater than a certain value in traditional. Based on the various artificial cross-section and natural ones, value-taking errors of hydraulic radius are studied in this paper. The results show that it's feasible to adopt the average water depth as the hydraulic radius when B/H of rectangular section is larger than 40 or B/H of isosceles triangular section is larger than 12. But for natural river, B/H is different when water level changes and there is no single-valued corresponding relationship between relative error and B/H. Therefore it is advised that hydraulic radius should be cautiously replaced by mean water depth in hydraulic calculation especially when cross-section is relatively narrow and deep.