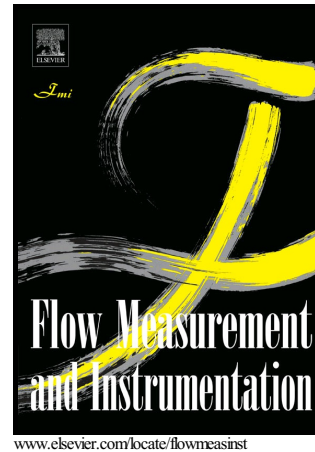


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Comparison the hydraulic characteristics of finite crest length weir with quarter-circular
crested weir

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Abstract

Weirs are used for flow measurement, flow diversion and water level control in open channels. In this study, experiments were conducted on finite crest length weir and quarter-circular crested weir and hydraulic characteristics of two weirs were compared together. Depending on the ratio of total upstream head H to weir crest length L , flow over the finite crest length weir was undular, parallel to the crest surface or curvilinear. Also, for $H/L > 1.82$, lower nappe separated from the upstream corner of crest and did not reattach to the crest surface. In the range of conducted tests ($H/L < 2.20$), flow over the quarter-circular crested weir was curvilinear and lower nappe did not separate from the crest surface. Due to the elimination of separation zone, which is the primary source of energy loss, discharge coefficient for quarter-circular crested weir is significantly larger than for finite crest length weir. Furthermore, negative (sub-atmospheric) pressure on the crest surface of finite crest length weir and quarter-circular crested weir occurred for $H/L > 1.52$ and $H/L > 2.2$, respectively. This result indicates that quarter-circular crested weir is less sensitive to cavitation danger.

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