

عنوان مقاله:

Experimental study of energy loss at drops

محل انتشار:

کنفرانس بین المللی هیدرولیک سدها و سازه های رودخانه ای (سال: 1383)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

A vertical drop or free overfall is a common feature in both natural and artificial channels. Natural drops are formed by river's bed erosion while artificial drops are built in irrigation systems to reduce the channel slope to designed slope. Due to more energy dissipation, drops are also applied in stepped spillways. The more energy dissipation is caused by mixing of the jet with the pool at downstream of each drop. As a result, it will be the cause of the reduction in the size of the energy dissipator that is generally provided at the toe of drops and stepped spillways. In the present paper, the energy dissipation in drops has been investigated by physical models. To reach the purpose of this study, after determination of effective parameters on the phenomenon, three drops with different heights have been constructed from plexiglas. They have been installed in two existing flumes in the hydraulic laboratory at Shahid Chamran university (SCU), Ahwaz, Iran. Several runs of physical models have been undertaken to measure required parameters for determination of the energy dissipation. Results showed that the energy dissipation in drops depends on the drop height and discharge. Predicted relative energy dissipations varied from 10.0% (for $yc/h=0.94$) to 94.3% (for $yc/h=0.02$). This work has also indicated that the energy loss at drop is mainly due to the mixing of the jet with the pool behind the jet that cause air bubbles entrainment in the flow. Further a statistical model has been developed to predict the energy dissipation in drops using SPSS that denotes nonlinear correlation between effective parameters. Comparison between this study's results and results of Moore, Rand, White, Rajaratnam and Chamani, showed that White's model over estimates the energy dissipation in drops and Rand's model under estimates the energy dissipation in drops. The others can predict the energy dissipation in drops as same as the proposed statistical model. The length of the downstream stilling basin predicted by White is 20% smaller than the others.

کلمات کلیدی:

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/3844>



