عنوان مقاله:

State of art in block ramp and downstream stilling basin design

محل انتشار:

نهمین سمینار بین المللی مهندسی رودخانه (سال: 1391)

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خلاصه مقاله:

Block ramps are hydraulic structures which are commonly used in river restorationprojects. Especially in the last few decades, the use of this type of structures havebecome more and more popular. They furnish a correct balance between thehydraulic functioning and the environmental care, as they minimize the impact onthe environment in which they are located. In addition, they can be consideredflexible structures, i.e. they can easily adapt to the in situ conditions and they canbe easily built to re-convert traditional concrete structures. They can be built eitherby loose or fixed blocks, arranged on a sloped bed. However, a correct design ofthis structural typology has to take into consideration several aspects. In particular,the hydraulic functioning of a block ramp is assured when the structure remainsstable, i.e. when the blocks are not removed from their original position. Thus, thefirst step in designing block ramps has to be the structural stability. Furthermore,the analysis has to focus also on the dissipative process occurring on them, inparticular it has to consider the different flow regimes that can take place and theeffect of the bed roughness on the energy dissipation. Another important aspect isthe stilling basin design. In fact, a block ramp has not to be considered as anisolated element in the contest in which it is located. It is part of that contest and itcontributes to modify it. Thus, it is extremely important to consider the scourprocess occurring downstream of the structure. In particular, the maximum scourdepth and length have to be carefully estimated in order to avoid structural collapseof the ramp. The scour process occurring downstream of the structure is alsoextremely important in terms of energy dissipation. In fact, the global dissipativeprocess is the result of two distinct processes: one occurring on the ramp and theother in the downstream stilling basin. Finally, the analysis has to take intoconsideration which are the global sediment transport conditions of the river inwhich the structure is located. Thus, it has to be conducted in both clear water andlive-bed conditions. It appears evident that a correct design of this type ofstructures is a complex .operation which requires a particular attention in order toavoid functioning problems

کلمات کلیدی:

block ramps, clear-water, erosive processes, hydraulics, live-bed