

Breathing Check Dam Management in a High-Sediment-Disaster Torrent

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Abstract

Frequent earthquakes and climate change have caused a dramatic increase in extreme sediment disasters in torrents, and these disasters commonly threaten downstream infrastructures and residents. With the passage of time and reduction in sediment yield, the numerous check dams that were built in the past to deal with the vast amounts of sediment then carried by several torrents have recently become threats to the long-term ecology and sediment transport continuity. The unchangeable check dam structure cannot easily cope with rapidly-changing sediment transport, therefore, the effective management of check dams is currently an important issue in Taiwan. In order to remedy the difficulty of modifying existing check dams, this study recommends that adjustable modular check dams, which are also known as breathing check dams, be used to meet the varying sediment transport, flood prevention, and ecological needs of torrents in different periods of time.

This study employed two cases involving open-type check dams located on Landao Creek, Huisun Forest. In the first case, after reduction in the height of two center piers in the slit dam that had already silted up, the adjustment in sediment and evolution in fluvial morphology were observed to provide a reference for the future removal dam. In the second case, a modular steel dam was constructed and used for long-term observation of the blockage of sediment and driftwood by the dam, and the resulting detailed records concerning sediment variation were used to draft dam structure adjustment approaches. The results of both cases emphasized routine management of check dams is necessary on torrents with highly variable bed load, and that it is indeed necessary to let torrents return to their natural state.

Key words: Breathing check dam, modular steel dam, nature torrents, sediment-related disasters.

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