



Sediment trapping efficiency of adjustable check dam in laboratory and field experiment

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Check dam has been constructed at mountain area to block debris flow, but has been filled after several events and lose its function of trapping. For the reason, the main facilities of our research is the adjustable steel slit check dam, which with the advantages of fast building, easy to remove or adjust it function. When we can remove transverse beams to drain sediments off and keep the channel continuity.

We constructed adjustable steel slit check dam on the Landow torrent, Huisun Experiment Forest station as the prototype to compare with model in laboratory. In laboratory experiments, the Froude number similarity was used to design the dam model. The main comparisons focused on types of sediment trapping and removing, sediment discharge, and trapping rate of slit check dam. In different types of removing transverse beam showed different kind of sediment removal and differences on rate of sediment removing, removing rate, and particle size distribution. The sediment discharge in check dam with beams is about 40%~80% of check dam without beams. Furthermore, the spacing of beams is considerable factor to the sediment discharge.

In field experiment, this research uses time-lapse photography to record the adjustable steel slit check dam on the Landow torrent. The typhoon Soulik made rainfall amounts of 600 mm in eight hours and induced debris flow in Landow torrent. Image data of time-lapse photography demonstrated that after several sediment transport event the adjustable steel slit check dam was buried by debris flow.

The result of lab and field experiments: (1)Adjustable check dam could trap boulders and stop woody debris flow and flush out fine sediment to supply the need of downstream river. (2)The efficiency of sediment trapping in adjustable check dam with transverse beams was significantly improved. (3)The check dam without transverse beams can remove the sediment and keep the ecosystem continuity.