



Trapping efficiency of three types check dams experiment

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The check dams constructed to trap debris flow. This study divide check dams into three types as closed-type check dam, slit dam, and modular steel check dam. Closed-type check dam which can trap all kind of sediment or driftwood. Slit check dam is permeable dam, so it can prevent from depositing all of sediment or driftwood. A modular steel check dam improves the existing hard-to-change disadvantages of slit dam structure. The assembling of longitudinal and transverse beams can be constructed independently, and then it could be freely configured to form a flexibly adjustable modular steel check dam.

This study used the laws of geometric similitude to design model of dam. To explore the trapping mechanisms and phenomenon in different dismantle transverse beams conditions and compared the trapping efficiency with different type of check dams. This study used different volume ratio with driftwood and sediment. In order to capture the trace of debris flow and calculate accuracy velocity of debris flow the study used several high-speed photography combining the method of 3D Remodeling from Motion Structure with Multi-View Stereo which constructed with multiple photos of overlapping coefficient at least 70% and established three-dimensional system of coordinate in laboratory experiment.

As a result, the driftwood deposition rate of modular steel check dam increase 60% than slit dam and 40% than closed-type dam; the debris deposition rate increase 30% than slit dam. In addition, the increment of driftwood volume ratio led to the increment of trapping efficiency of three type of check dams. Meanwhile slit dam is the most effective type in trapping driftwood and sediment with more than 50% of increased rate, because of more driftwood flow through the slit dam jam together easily. Finally, transverse beams which installed the modular steel check dam can suppress the upward movement of driftwood, therefore driftwood can easily form the arched stacking efficiency with transverse beams and enhance the trapping effect.