

防砂壩溢壩水舌經透水柵阻擾後對下游底床泥砂淘刷之研究

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摘 要 傳統非透過性防砂壩普遍設於野溪中上游,大部份業已淤滿土砂,完成當初野溪整治階段性任務,但自從 921 地震過後,本省約 1420 條溪流易發生土石流,這些防砂壩對於土石流僅能防止規模擴大,不能有效降低規模,同時在清水流時因壩體下游淘刷威脅,隨時有遭破壞之虞。而在土石流防治工法中,透水柵已由日本於現場設置,並於土石流侵襲時做過實況觀測,證實除具有篩分、貯存土砂、停止等透過性防砂壩優點外,另因其平鋪河床,故不受巨石撞擊之威脅,較適合本省礫石型土石流的防治;惟因特殊外型,設置場所需具備階段式河川地形,若能藉已設防砂壩下游階段地形與之共構,則一方面可減緩防砂壩下游底床之淘刷,一方面遭土石流侵襲時可充分發揮防治效果;再者,常水流時,可藉防砂壩溢洪口束縮水流,排放貯留於柵上下層之泥砂顆粒,騰出貯砂空間,可說具節省成本、互補等功能。本研究係探討兩者共構對防砂壩下游淘刷減緩及土石流防治效果第一階段的成果,經水槽試驗得出共構後各冲刷參數間無因次迴歸關係式,並證明下游冲刷坑比僅設壩時坑深變淺、坑心距拉長、形狀因子變大,且使得冲刷坑成為長扁狀,因此證明防砂壩與透水柵共構後,因透水柵阻擾溢壩水舌,確實能減輕下游底床泥砂淘刷之威脅。

關鍵詞：防砂壩、透水柵、土石流、淘刷。

Downstream Scoured by Free-Overfall Flows through Check-Dam combined with Bottom Infiltration Screen

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ABSTRACT There have been many Check-dams built across rivers and sand has been fully deposited at their upstream in Taiwan. Although they have accomplished their tasks of controlling rivers in gradation, they cannot reduce the scale of debris flow which existing in rivers. According to government's investigation, there have amount of 1420 rivers that have potential breaking out debris flow after 921 earthquakes happened. In the meantime they are always threatened by scour at downriver.

That bottom infiltration screen can prevent debris flow has been proved in Japan. Which not only can sift large particles but also deposit sand after debris flow passes through it. In addition, it can avoid the impact of huge stone. This is suitable for grave-type debris flow which occurs usually in Taiwan. So, after combining Check-dam with Bottom infiltration screen, which can prevent debris flow also.

For specific shape of Bottom infiltration screen, it must be constructed on terrace. And

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it's suitable for putting at Check-dam's downriver. After that, Bottom infiltration screen can upgrade efficiency for Check-dam in reducing scale of debris flow. With ordinal flow in river, Check-dam can help to sweep away sand which is deposited on the Bottom infiltration screen or beneath it.

For those saving budget and complementary considerations, Check-dam combined with Bottom infiltration screen to prevent debris flow is a good conception.

This study is the first result for researching the interaction in prevention of debris flow by Check-dam combined with Bottom infiltration screen. After flume experimental analysis, we proved that it could reduce the downstream scoured by free-overfall flows. After combination, the distance between Check-dam and the center of scour by free-overfall flow passing through it was longer than that passing Check-dam alone. And the depth of scour was much shallower after flow passed through co-construction. The values of shape factors were much longer when Check-dam was combined with Bottom infiltration screen. Therefore, the threat of scour in downriver would reduce after Check-dam is combined with Bottom infiltration screen.

Key Words: check-dam, bottom infiltration screen scour, debris flow.