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Some key problems on survey and design of debris flow in Wenchuan earthquake area

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After the "5.12" Wenchuan earthquake in 2008, it is summarized systematically about the reasons of the poor governance effect and failure condition (mainly about the significantly smaller estimation of the launch quantity in loose materials source, the insufficient design capacity of the silt dams and the section of the drainage grooves) in initial treatment such as silt dams, drainage ditches in 2009. This is caused by the insufficient recognition of the formation and outbreak regularity characteristics of earthquake debris flows, especially for the insufficient understanding of continuous, massive and group-occurring of the debris flow in earthquake area. Some significant differences between debris flow in earthquake area and general area such as the outbreak mechanism, blocking and burst, duration time and the volume rushed out, were proposed through the exploration, design and management of engineering practice of two giant debris flow in 2010, 2013. There are a lot of experiences worthy to summarize in exploration and design: 1) how to reasonably determine the blocking collapse coefficient and the corresponding discharge of the debris flow? 2) how to put forward effective protection regulation according to different types of debris flows and the preserved objects (how to effectively combine the block, slope reinforcement, drainage ditch and silting)? 3) how to effectively distribute the effective height and number of the dams? 4) which kind of structure type (such as entity dam, cracks dam, comb dam) is more effective? The above ideas are fully verified and successfully used in engineering exploration, design and management project of some typically large debris flows in Qingping Wenjia gully in Mianzhu County, Hongchun gully, Qipan gully in Wenchuan County and Lenmu gully in Baoxing County, China.

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