

Risk Assessment for Debris Flow of Langqing Valley of G562, Xizang(Tibet), China



HUANG Yonggao^{1,*}, ZHOU You², HAN Fei¹ and LI Yingxu³

¹ Sichuan Geological Survey, Evaluation and Utilization of Strategic Rare Metals and Rare Earth Resource Key Laboratory of Sichuan Province, Chengdu 610081, Sichuan, China

² Sichuan Institute of Geological Engineering Investigation, Chengdu 610072, Sichuan, China

³ China Geological Survey, Chengdu Center, Chengdu 610081, Sichuan, China

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Abstracts: Langqing valley is located at the right bank of the Xiang River in Langqing village, Namuling County, Shigatse, Tibet, and about 600m upstream of the proposed Xiang River hydro-junction. In recent years, the geological hazard of the debris flow has been actively, which directly threatening the safety of life and property of Langqing people, as well as the Xiang River hydro-junction and G562. The entire drainage basin consists of a main ditch and four furrows, with a 'V' shape in the main ditch, whose longitudinal length is about 6km and watershed area is about 12km². In general, the Langqing valley steep terrain, with big difference of elevation, and large longitudinal grade, and the watershed form is favorable to the confluence of water flow, the circulation area is narrow, which make it easy to breed mudslide. Loose deposits are widely distributed in the basin, mainly including channel accumulation, collapse-landslip accumulation and slope erosion accumulation. The geomorphology, provenance, structural environment and water resources of the Langqing valley are favorable to the formation of debris flow, and once the conditions are satisfied, there is the possibility of the re-occurrence of debris flow. The debris flow in Langqing valley belongs to the typical rainstorm-valley-type diluted debris flow, its volumetric weight is 1.685 g·cm⁻³, the velocity of debris flow is very fast, the erosion force is strong, and it can cause serious damage. The results of the risk assessment of this debris flow is considered to be moderate, influenced by the topography on both sides of the main ditch, if debris flow breaks out, it will block the river. That will be directly threatening safety of the person and property of residents, construction and operation of the Xiang River hydro-junction and G562. Therefore, enough attention should be paid to this kind of debris flow in this small watershed. The debris flow in Langqing valley has a high frequency of occurrence and great risk of mudslide disaster. While, Namulin county is located in the plateau mountainous area, and there are a large number of such debris flow valleys. The loose solid materials on both sides of those valleys are rich and have the conditions for the occurrence of debris flow, especially during the rainy season. If sustained high-intensity rainfall occurs, it's easy to cause the geological hazards of debris flow. In response to such situations,

the following prevention and treatment suggestions are proposed:

- 1) Focusing on the protection of residential areas, appropriate management projects should be arranged in those valleys with certain risk to reduce the threat of floods and debris flow to the villages and farmland, for example, building check dam in the circulation area, reducing the source of solid matter of the debris flow, and constructing drain and guide ditch at the downstream.
- 2) Strictly control unreasonable human engineering activities in the basin to ensure the personal and property safety of construction site of the Xiang River hydro-junction and G562.
- 3) Establishing the emergency warning plan for sudden natural disaster, improving the emergency warning system, strengthening the popularization of knowledge of natural disaster such as debris flow, improving self-saving consciousness and ability.
- 4) Local government should give proper guidance and planning to the residential site selection and land development.
- 5) Protecting and improving the ecological environment, reducing the ecological damage caused by human activities, such as closing hills for afforestation, prohibiting excessive grazing, and so on.

Key words: debris flow, risk assessment, analysis of river-blocking, G562

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About the first author



HUANG Yonggao, male, born in 1987 in Xiantao city, Hubei Province; master; graduated from Guilin university of technology; assistant director and engineer of Sichuan Geological Survey. His main research directions are investigation and research of basic geology. Email: hyonggao@126.com; phone: 028-83184441, 15902879525.

* Corresponding author. E-mail: hyonggao@126.com