

Road Blockage Assessment in Mountain Village by Multi-hazard Numerical Simulation

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Due to worldwide climate change, the frequency of extreme rainfall events raise in Taiwan, especially typhoon rainfall event. It caused many multi-hazard like debris flow, landslide and flood. Defining the potential area of multi-hazard was difficult, because of the interaction and impact between compound disasters. Furthermore, many mountain villages in Taiwan always faced road blockage when multi-hazard happened. This situation was called “Disaster Isolation Effect”, it meant this village will become an isolation island and villagers can't escape to outside with any roads. Therefore, it was very important to assess the risk of road blockage for multi-hazard. This study aimed to analyze the risk of road blockage in mountain village via multi-hazard numerical simulation including debris flow and flood. Debris flow and flood were computed by FLO-2D and HEC-RAS, respectively. The Nansalu village occurred extreme road blockage during typhoon Morakot in 2009 was used as a case study. Firstly, the FLO-2D was derived to simulate the sediment transport and terrain changed of debris flow. Secondly, the HAC-RAS will be applied for simulating flood computation after the serious terrain change. Finally, this study integrated all hazard area to perform road blockage assessment with overlay analysis. The simulation result showed that the Nansalu village will face road blockage, and become an isolation island by multi-hazard. As a result, it was necessary for official to assess road blockage in mountain village via defining potential area of multi-hazard numerical simulation before disaster happened.