

Highway flood hazard mapping in Thailand using the Multi Criteria Analysis based the Analytic Hierarchy Process

Saisunee, Budhakooncharoen*,
Wichien Mahadhamrongchai and Jiraroth Sukolratana**

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ABSTRACT

Flood is one of the major natural disasters affecting millions of people. Thailand also, frequently faces with this type of disaster. Especially, 2011 mega flood in Central Thailand, inundated highway severely attributed to the failure of national economic and risk to life. Lesson learned from such an extreme event caused flood monitoring and warning becomes one of the sound mitigations. The highway flood hazard mapping accomplished in this research is one of the strategies. This is due to highway flood is the potential risk to life and limb, and potential damage to property. Monitoring and warning therefore help reducing live and property losses. In this study, degree of highway flood hazard was assessed by weighting factors for each cause of the highway flood using Multi Criteria Analysis (MCA) based Analytic Hierarchy Process (AHP). These weighting factors are the essential information to classify the degree of highway flood hazard to enable pinpoint on flood monitoring and flood warning in hazard areas. The highway flood causes were then investigated. It was found that three major factors influence to the highway flood are namely the highway characteristics, the hydrological characteristics and the land topography characteristics. The weight of importance for each cause of the highway flood in the whole country was assessed by weighting 3 major factors influence to the highway flood. According to the result of MCA analysis, the highway, the hydrological and the land topography characteristics were respectively weighted as 35, 35 and 30 percent influence to the cause of highway flood. These weighting factors were further utilized to classify the degree of highway flood hazard. The Weight Linear Combination (WLC) method was used to compute the total score of all highways according to each factor. This score was later used to categorize highway flood as high, moderate and low degree of hazard levels.

Highway flood hazard map accomplished in this research study is applicable to serve as the handy tool for highway flood warning. However, to complete the whole warning process, flood water level monitoring system for example the camera gauge should be installed in the hazard highway. This is expected to serve as a simple flood monitor as part of the warning system during such extreme or critical event.

* Executive Committee, Thai Hydrologist Assembly Associate Prof., Dept. of Civil Eng., Mahanakorn University of Technology, Bangkok, Thailand

** Department of Highway