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www.elsevier.com/locate/jobe

PII: S2352-7102(18)30024-X
DOI: https://doi.org/10.1016/j.jobe.2018.02.016
Reference: JOBE419

To appear in: *Journal of Building Engineering*

Received date: 6 January 2018
Revised date: 19 February 2018
Accepted date: 22 February 2018

Cite this article as: Dipendra Gautam and You Dong, Multi-hazard vulnerability of structures and lifelines due to the 2015 Gorkha earthquake and 2017 central Nepal flash flood, *Journal of Building Engineering,* https://doi.org/10.1016/j.jobe.2018.02.016

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ACCEPTED MANUSCRIPT

Multi-hazard vulnerability of structures and lifelines due to the 2015 Gorkha earthquake and 2017 central Nepal flash flood

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Accepted manuscript

Abstract

The 2015 Gorkha earthquake caused severe damage to structures in central Nepal. In 2017, a flash flood event occurred in the same area affected by the Gorkha earthquake and aggravated the damage to structures and lifelines. The present paper reports the damage of structures and lifelines subjected to multi-hazards in the affected area in central Nepal. Field investigations were performed after the Gorkha earthquake as well as the 2017 Chhatiune Khola flash flood. Specifically, damage associated with bridges, vernacular stone masonry buildings, roads, water supply systems, irrigation canals, electric poles, and road signs was assessed. Field measurement in terms of flow height was recorded in the case of vernacular buildings, and depth-damage curve due to the flash flood is depicted in this study. We have outlined the multi-hazards vulnerability of vernacular stone masonry buildings along the river banks susceptible to flash floods in this study. Moreover, a quantified damage scenario due to a strong earthquake and a flash flood is highlighted using field records.

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