

## **SEISMIC VULNERABILITY ASSESSMENT OF REINFORCED CONCRETE BRIDGE PIER USING FRAGILITY CURVE**

**Abstract**—Nepal being earthquake prone zone has seen many high magnitude earthquakes in recent history causing serious damages to bridge and its components. Bridges should remain serviceable even after earthquake for emergency activities and rescue operations. For assessing the seismic vulnerability of bridges, fragility curves are very important tool. Hence, this paper focuses on the use of analytical method for development of fragility curve for reinforced concrete bridge pier. Capacity of bridge is determined by nonlinear static analysis and Demand parameter is estimated using linear time history analysis. Time history data of five historic earthquakes are used to perform time history analysis. Characterization of fragility functions is done by assuming log normal distribution. It is obtained that initiation of damage in selected pier at 0.7g for Immediate occupancy level and around 1.2g for Life Safety and Collapse Prevention level. Considering a particular value of PGA as 1.5g, there is probability of exceedance the performance level IO, LS and CP are 91.60%, 20.05% and 8.52% respectively.

**Keywords**—*bridge, seismic vulnerability, fragility curve, lognormal distribution, performance level*