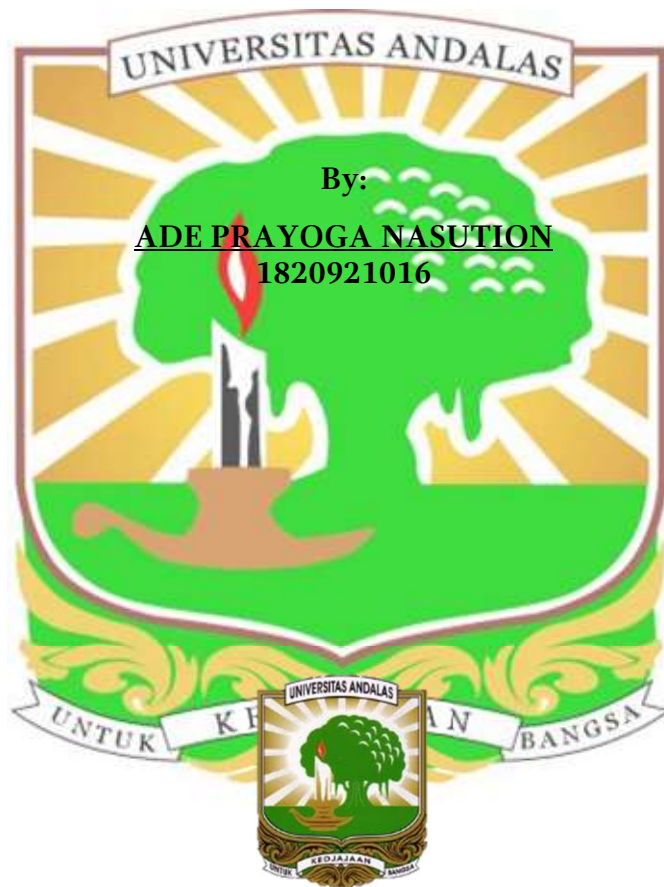


FRAGILITY CURVES ANALYTIC FOR SEISMIC EVALUATION OF CABLE-STAYED BRIDGE

THESIS



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FRAGILITY CURVES ANALYTIC FOR SEISMIC EVALUATION OF CABLE-STAYED BRIDGE

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ABSTRACT

Abstract. This study presented the convenient method to develop the fragility curves in probability of damage exceedance and intensity relation of the cable-stayed bridge. Performance of a bridge can be shown by the vulnerability of the structure in resisting a seismic motion. The performance of this structure was then developed in a curve namely fragility curve. The fragility curve is a graph that define the probability of exceedance for damage state to given the seismic intensity. The use of the fragility curve can be developed to ensure the safety and strength of the bridge during and after earthquake motion. For this purpose, The Bridge need to be analyzed using the seismic load in different intensity to ensure that the structure was experiencing damage in several condition. This study calculated the fragility curve of the cable-stayed bridge refer to cloud approach. The fragility curves were obtained by analyzing the structure using Nonlinear Time History (NTHA) of the bridge model using analysis software. The ground motions of the earthquake were subjected to the bridge in different intensities which are scaled from the initial ground motion. The ductility of the structure was developed into the fragility curves as the response of the bridge. Furthermore, the structure damage; slight, moderate, extensive, and complete due to the seismic load were then classified based on the HAZUS standard. Thus, the values of the damage states were generated to the fragility curve using the probabilistic values of the damage states. To ensure the goodness of fit data statistically, Kolmogorov-Smirnov test was conducted to the fragility function. The result revealed that the fragility curves was qualified as the lognormal distribution and can be used to estimate the vulnerability of the cable-stayed bridge.

Keywords: Fragility curves, Nonlinear Time History, HAZUS.