

REPAIR PROJECT OF A VEHICULAR BRIDGE DAMAGED DURING THE 2017 PUEBLA-MORELOS EARTHQUAKE: SEISMIC EVALUATION

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SUMMARY

This paper shows the results of nonlinear analyses, static and dynamic, conducted on a vehicular bridge located in Mexico City. The main characteristics of the developed numerical model and the results of the analysis in terms of capacity curves, global and by element, are presented. Two cases were studied. The first one considers that the seismic restrainers, located at the bridge abutments, can effectively limit the lateral movements; while the other case considers poor lateral restriction. The results show that the first case provides an adequate safety factor for the bridge, while the second case resulted in a marginal safety factor.

Keywords: *Bridge Seismic Evaluation; Structural Health Monitoring, Seismic behaviour; Nonlinear Analysis.*

1. INTRODUCCIÓN

As a consequence of M7.1 Puebla-Morelos Earthquake, which occurred in Mexico on September 19, 2017, the need has arisen to evaluate the performance of some constructions that are part of the infrastructure of Mexico City. This is the case of a vehicular bridge located in one of the main communication roads in the eastern part of the city, a 7 km long urban toll road made up of bridges, tunnels, junctions, elevated viaducts and surface roads. Figure 1 shows a photograph of the bridge studied.



Fig. 1. Vehicular bridge.

Due to the fact that the vehicular bridge had minor damaged during the earthquake, a review of its structural capacity, with respect to the current seismic design criteria of Mexico City, was carried out. It was necessary to develop representative numerical models and evaluate the congruence between them and information obtained experimentally through field tests. Furthermore, non-linear analysis, static and dynamic, were conducted as a useful tool to understand better the behavior of the bridge under possible seismic scenarios.