



Assessment of Seismic Behaviour of Portal Bridges with Double Friction Pendulum Bearings

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Summary

In this paper the seismic behaviour of two parallel portal bridges with a total span of 315 m is presented. These bridges are located in an area of high seismicity and therefore supports design include double friction pendulum bearings as a base isolation system with the aim of improving the seismic response keeping it within the elastic range. Several nonlinear numerical models for the whole bridge and the friction pendulums were developed and validated with pendulums experimental tests by comparing both sources of information.

Keywords: Prestressed portal bridge, nonlinear dynamics, friction pendulum, seismic analysis.

1. Introduction

The bridges are located over the Chiche river in Ecuador. Figure 1 shows the bridge final design consisting of two parallel portal bridges with cantilever construction process [1], four line roads each one, a total span of 315 m, a central span of 175 m and two lateral spans of 74 m.

The construction process consists of 23 phases, starting with foundations of abutments, piles and temporary piers, placement of frictional pendulum bearings and formworks, concreting of lateral cells, abutments and lateral span slabs, balanced cantilever construction with top roller units in 17 steps and finally by concreting the central segment.

Figure 2 shows the lateral cells and the support details. Bearings in abutments are performed with two confined neoprene at the top and two neoprene pads at the bottom, which allow for free