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# Response of buried arch bridge structure to seismic impact

**Konstantin Kazakov**

[kazakov@abv.bg](mailto:kazakov@abv.bg)

University of Structural Engineering and Architecture L. Karavelov  
Sofia, Bulgaria

**Lena Mihova**

[l\\_mihova@yahoo.com](mailto:l_mihova@yahoo.com)

University of Architecture, Civil Engineering and Geodesy  
Sofia, Bulgaria

**Doncho Partov**

[partov@vsu.bg](mailto:partov@vsu.bg)

University of Structural Engineering and Architecture L. Karavelov  
Sofia, Bulgaria

## ABSTRACT

Dynamic analysis of the arch bridge is performed using time history of acceleration for the input motion. The prototype of the structure is a transport bridge in Bulgaria. Three real accelerograms of strong earthquakes with motion characteristics typical for the Balkan Peninsula region are considered. Finite element model of the structure and a body of ground and filling material is created by the Plaxis 2D software. Dashpots are applied as supports of the soil-structure system to simulate the infinite soil space in the numerical FE analysis. The Hardening-Soil-Small (HSSsmall) constitutive model is used for describing the soil mechanical behaviour. This model handles a large number of material parameters and takes into account the degradation of the soil stiffness subjected to seismic loading. An additional viscose attenuation of 5% for the soil is introduced. Analysis and interpretation of the results are carried out.

**Keywords:** arch bridge, plane strain, finite element, HSS model, time history analysis

## 1 INTRODUCTION

The purpose of this study is to present and discuss results from seismic time history analysis of buried bridge structure. The prototype of the structure is the reinforced concrete bridge of width 15.29 m and height 8.67 m which realizes the railway-road junction near the villages Trivoditsi and Novo Selo in Bulgaria (Figure 1).



Figure 1: The bridge in construction and service phases