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Identification of vertical frequency response of masonry arch bridges for numerical analysis

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Abstract

Masonry arch bridges are generally old structures with historical and patrimonial value built based on empirical rules for small traffic loads. Identification of the dynamic properties could be an important parameter to evaluate the response of such bridges to actual traffic loads and to update numerical models used to study its structural response. Thus, this paper presents a expedite method to determine vertical natural frequencies for a set of several masonry arch bridges located in Bragança district, Portugal. The dynamic properties were obtained through environmental vibration tests allowing to identify the dynamic properties in the frequency domain. The identification of the natural frequencies allowed the analysis of the influence of some geometrical parameters of the bridges and the relationship between these and the frequency range of the excitation source. Moreover, the database of the study can be used in future analysis to update FEM models of these structure.

Keywords

Masonry arch bridges, Dynamic properties, Identification