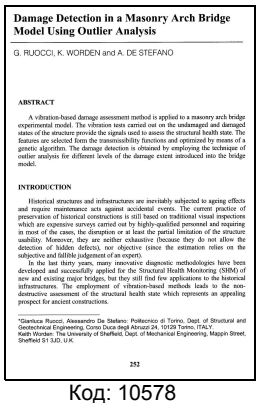

Damage Detection in a Masonry Arch Bridge Model Using Outlier Analysis

G. RUOCCI, K. WORDEN and A. DE STEFANO

ABSTRACT

A vibration-based damage assessment method is applied to a masonry arch bridge experimental model. The vibration tests carried out on the undamaged and damaged states of the structure provide the signals used to assess the structural health state. The features are selected form the transmissibility functions and optimized by means of a genetic algorithm. The damage detection is obtained by employing the technique of outlier analysis for different levels of the damage extent introduced into the bridge model.

INTRODUCTION

Historical structures and infrastructures are inevitably subjected to ageing effects and require maintenance acts against accidental events. The current practice of preservation of historical constructions is still based on traditional visual inspections which are expensive surveys carried out by highly-qualified personnel and requiring in most of the cases, the disruption or at least the partial limitation of the structure usability. Moreover, they are neither exhaustive (because they do not allow the detection of hidden defects), nor objective (since the estimation relies on the subjective and fallible judgement of an expert).

In the last thirty years, many innovative diagnostic methodologies have been developed and successfully applied for the Structural Health Monitoring (SHM) of new and existing major bridges, but they still find few applications to the historical infrastructures. The employment of vibration-based methods leads to the non-destructive assessment of the structural health state which represents an appealing prospect for ancient constructions.

*Gianluca Ruocci, Alessandro De Stefano: Politecnico di Torino, Dept. of Structural and Geotechnical Engineering, Corso Duca degli Abruzzi 24, 10129 Torino, ITALY.
Keith Worden: The University of Sheffield, Dept. of Mechanical Engineering, Mappin Street, Sheffield S1 3JD, U.K.

252

Код: 10578

G. Ruocci, K. Worden, A. De Stefano

Damage Detection in a Masonry Arch Bridge Model Using Outlier Analysis

Издательство DEStech Publications, Lancaster, 2010 год

6 стр; формат: 23,5 x 16 см; библиографический список: 5 единиц
ISBN: 978-1-60595-024-2

A vibration-based damage assessment method is applied to a masonry arch bridge experimental model. The vibration tests carried out on the undamaged and damaged states of the structure provide the signals used to assess the structural health state. The features are selected form the transmissibility functions and optimized by means of a genetic algorithm. The damage detection is obtained by employing the technique of outlier analysis for different levels of the damage extent introduced into the bridge model.

Ключевые слова:

Содержание.