Structural health monitoring of a suspension bridge in Istanbul, Turkey

Fact Sheet

Project Information

SHM

Grant agreement ID: 36541

Project closed

Start date
1 June 2006

End date
31 May 2008

Funded under
Human resources and Mobility in the specific programme for research, technological development and demonstration "Structuring the European Research Area" under the Sixth Framework Programme 2002-2006

Total cost
No data

EU contribution
€ 80 000,00

Coordinated by
KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE, BOGAZICI UNIVERSITY
Türkiye

Objective

The proposal request funds to develop a real-time vibration monitoring and condition assessment system, i.e. a Structural Health Monitoring (SHM) system, for a

suspension bridge. The bridge selected for the study is the Fatih Sultan Mehmet Bridge, also known as the Second Bosporus Bridge, in Istanbul, Turkey. We propose to monitor the static and dynamic motions of the bridge continuously by using acceleration, GPS, and rotational sensors, and develop real-time algorithms for data analysis and damage detection.

One of the primary objectives of the SHM system will be to detect damage after earthquakes. We postulate that damage can be detected based on the changes in the natural frequencies of the bridge during the earthquake, plus the presence of any permanent deformations after the earthquake. The former is determined from the analysis of earthquake response data, whereas the latter is determined from the comparison of pre- and post-earthquake ambient response data. We propose to use GPS sensors and rotational sensors to measure permanent deformations. The key product of the research will be an automated structural condition assessment and damage detection software for the bridge.

The project will be the first application of SHM in Turkey. The bridge is a critical lifeline in Istanbul, a city with 62% probability for a large earthquake within the next 30 years. The proposed SHM system will not only monitor the current condition of the bridge, but also provide crucial data to predict its response for future earthquakes. The knowledge and experience gained from this project will help to develop similar SHM systems for other bridges throughout Europe, leading to safer structures and reduced maintenance costs. The project will be completed by the Kandilli Observatory and Earthquake Research Institute of Bogazici University, where the applicant will be based, in collaboration with the General Directorate of Turkish Highways.

Fields of science (EuroSciVoc)

natural sciences > computer and information sciences > **data science**

natural sciences > computer and information sciences > **software**

engineering and technology > civil engineering > structural engineering > **structural health monitoring**

natural sciences > earth and related environmental sciences > geology > **seismology**

engineering and technology > electrical engineering, electronic engineering, information engineering > electronic engineering > **sensors**

Keywords

Structural response | damage detection | earthquakes | real time monitoring

Programme(s)

FP6-MOBILITY - Human resources and Mobility in the specific programme for research, technological development and demonstration "Structuring the European Research Area" under the Sixth Framework Programme 2002-2006

Topic(s)

MOBILITY-4.2 - Marie Curie International Reintegration Grants (IRG)

Call for proposal

FP6-2004-MOBILITY-12
See other projects for this call

Funding Scheme

IRG - Marie Curie actions-International re-integration grants

Coordinator

KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE, BOGAZICI UNIVERSITY

EU contribution

No data

Total cost

No data

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Links

Contact the organisation Website
HORIZON collaboration network

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Permalink: https://cordis.europa.eu/project/id/36541