

This project is based on the following objectives:

1. Unitary system approach and passive systems for earthquake isolation of bridges and viaducts.

Corresponding activities of this objective are designed to accumulate knowledge on the one hand by setting up databases and on the other by the exchange of experience with scientific researchers in this area . This should be identified and analyzed from a structural and functional point of view:

- Systems currently used for seismic protection of bridges, in order to find solutions to remedy the deficiencies arising in operation for modern seismic protection of bridges, to evaluate operating parameters.
- For the successful achievement of this objective will be consulted monographs , scientific papers and periodicals publication in the field of earthquake protect bridges and viaducts.

2. Analysis of dynamic requests from the traffic and the seismic activity quantitative and qualitative evaluation of dynamic response of a viscoelastic system connections may be made in terms of depth knowledge of the disturbing signals in the system. In other words, to better describe a system output, the knowledge of input into the same system is required . For this reason, will be analyzed types of excitation signals of bearing structures of bridge type from road traffic and seismic activity. The whole activity will be based on the software license, which already exists in the research infrastructure of the host institution. Research results will be disseminated widely.

3. Numerical and experimental testing of viscoelastic systems subjected to dynamic requests
Two directions of research will be followed, namely:

- The response parameters on viscoelastic elements at excitement pulse will be evaluated, in terms of systems theory;
- Viscoelastic systems will be experimentally tested in different regimes at dynamic application.

The results of two research directions will be compared for the refining of the physical - mathematical models. Research results will be disseminated widely.

4. Theoretical research of dynamic response of bridges and viaducts components to claims arising from seismic activities

The activities corresponding to this objective are to create the physical and mathematical models of bridges resting on earthquake systems, in order to evaluate the dynamic behavior, in the event of seismic activity or road traffic requests. To facilitate these activities there will be both and used software SAP2000 (Bridge Templates), which is a program able to generate models of various types of bridges, in different ways of base boundary, to analyze their behavior in traffic or seismic activity. Research results will be disseminated widely.

5. Experimental validation of the dynamic laws and structural nonlinear viscoelastic passive systems of protection against vibrations

The influences of the behavior of nonlinear systems with viscoelastic boundary links, over the dynamic response to impulsive demands, will be identified and quantified experimentally. Boundary systems with viscoelastic links, characterized by an increased degradation factor, will be tested in laboratory. The results of these experimental measurements will be introduced to computer aided analysis of the structure of bridges and required dynamic viaducts. Research results will be disseminated widely.

6. Developing a procedure to evaluate and characterize performance capability and efficiency of passive protection systems against against natural hazards and anthropogenic

Based on developed activities, a procedure for evaluation and characterization of the performance capability and efficiency of passive protection systems against natural hazards and anthropogenic will be carried up. Tests will be in situ over a bridge resting structure subjected to earthquake demands of road traffic parameters to quantify the structure dynamic response, such as: kinematical parameters of vibration, hysteresis curves, transmissibility and it's derived parameters. Wavelet denoising techniques will be used to filter the acquired signals. Final documentation will be developed and the results will be published to disseminate.

Measurable project contributions

The proposed project responds to the need to reduce risk factors, originating from natural and anthropogenic chances for vital construction of bridges and viaducts category and also to protect the human factor. Through this project will be trough measurable contributions like:

- characterization of dynamic performance isolation passive control systems, depending on the degree of degradation of viscoelastic constituent link elements;
- physical modeling- mathematical bridges and viaducts in different configurations of base isolation, assuming linear and nonlinear developed forces in passive control systems with viscoelastic links;
- developing a methodology able to identify the capability and performance while reducing the efficiency of passive protection systems against natural and anthropogenic hazards, in the structure of bridges and viaducts.

Objectives, methodology and expected results of the project 597

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