

Proposal for a new EAEE Task group:

TG11: Seismic Design, Assessment, and Retrofit of Bridges

The idea for setting up a new EAEE task group dealing with seismic aspects of bridge design, assessment, and retrofit, originated following the success of the special session on this topic organised by A. Kappos (Greece), with K. Kawashima (Japan) as co-convenor, at the 13th ECEE in Geneva (Sep. 2006). This session brought together researchers from all over the world working in the important international group *fib* TG7.4 (Seismic design and assessment procedures for Bridges) and the ongoing programme ASProGe (Seismic Protection of Bridges) in Greece, along with other groups such as the American one working on Caltrans bridges. The idea of the new group was welcomed by both the newly elected Ex. Committee of the Association and by the people that attended the special session and the conference.

The choice of the TG title is quite topical, since bridges that are the most critical (from the seismic point of view) component of transport systems, are not covered by existing EAEE task groups. It is noted that within the European Union, the motorway network expanded from 39200 km in 1990 to 49200 km in 1999, and the figure keeps increasing at a fast rate. As an example, in Greece the most significant expenditure on road infrastructure is conducted through the Trans-European Network, which accounted for €13.6 billion; a large number of bridges have been constructed in Greece during the last decade, the majority of which was along the 680 km Egnatia Motorway that includes 646 bridges. Meanwhile, assessment of seismic performance of existing bridges, some of which clearly fail to satisfy the requirements of modern codes, has been the focus of substantial research efforts worldwide, particularly during the last few years. As a result of such concerns, programmes for retrofitting seismically deficient bridges have originated in several European countries, notably in Italy, and similar efforts are underway in the US and Japan.

Topics to be covered by the new group include:

- Performance-based design of bridges (concrete and steel bridges).
- Calibration of code procedures for seismic design of bridges - Comparative assessment of European (Eurocode 8 - Part 2) and international (US, Japan, other) standards and design practice for bridges; calibration studies might be analytically and/or experimentally oriented.
- Improved analytical procedures for assessment of seismic performance of bridges, with emphasis on pushover methods accounting for higher mode effects.
- Fragility curves for bridges (methodologies and case studies).
- Application of passive systems (seismic isolation and energy dissipation devices) to existing bridges – development and application of new technologies.
- Seismic retrofit of bridge columns and foundations – Innovative retrofit methods.
- Analytical and experimental investigation of critical bridge components (with a view to improved design or effective retrofit).
- Instrumentation of bridges and structural health monitoring (with emphasis on seismic aspects); assessment of bridges based on instrumentation data.
- Displacement-based and performance-based assessment methods; deterministic and probabilistic approaches.

- Improved procedures for the optimal selection of earthquake loading (also including the effects of spatial variation of ground motion), and analysis of soil - structure interaction effects.

The **membership** of the new TG is mainly drawn from the European academic and professional groups active in the field, but some distinguished researchers from other countries (not members of the EAEE) are also included either as full members (if they can attend meetings in Europe) or as corresponding members. The membership of the TG has a strong international flavour as (practically) all European countries active in research on seismic assessment, design, and retrofit of bridges are represented, along with some leading academics from the US (with strong links with Europe).

In addition to meetings, the foreseen **activities** of the TG are (in a non-exclusive way):

- Dissemination of the research results produced by the TG members among them, as well as among the engineering community at large (a key point in this respect would be the launching of a **web site** with ability to upload and download material from it)
- Organization (every 2-3 years) of a **workshop** bearing essentially the same title as the TG, with oral presentations, round table discussions and other similar activities; CD ROM proceedings of the workshops will be available at their beginning
- Compilation of **state of the art reports** on topics falling within the scope of the TG, preferably in the form of special issues of the Bulletin of Earthquake Engineering (the official EAEE journal). Production of **design-oriented documents** (such as comparison of bridges designed to different code procedures) is also envisaged.
- Promotion of closer relationships and strong international outreach to US programmes on bridges such as that at the PEER Centre and the emerging US-Japan programme on bridge research.

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