



Strategies for the assessment of earthquake resistance of important existing buildings – work within European IP LESSLOSS

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IP LESSLOSS/ SP5 focuses on innovative methods for the assessment of important existing buildings, which must remain serviceable also during and after an earthquake (structures of vital importance for civil protection, e.g. hospitals, fire stations, power plants, important bridges, schools, assembly halls, etc.). The main idea is to integrate experimental tools into the assessment procedures. A Level III assessment procedure with a detailed 3D structural model updated via measured dynamic properties will be appropriate in most cases. If such investigations are carried out in the pre-earthquake phase, measures for seismic upgrading can be undertaken in due time. In the post-earthquake phase these investigations will support the determination of the remaining safety and serviceability. Further, simplified vulnerability models for the above structures can be elaborated from detailed case studies, which can be used in the context of Level II or Level I approaches. In the first year two main deliverables were elaborated, which mean the background documentation for the planned “European Manual for in-situ Assessment of the Earthquake Resistance of Important Existing Structures”. In deliverable D20 assessment methods are demonstrated via case studies for existing buildings, bridges and hospitals. Further, the use of modal identification applied to physical models damaged at LNEC shaking table is shown. Some of the studies are directly oriented towards the assessment of the earthquake capacity. Others are more oriented towards general structural monitoring, but include important elements, which are necessary when measurements + calculations shall be used to elaborate and judge stiffness decreases due to damages caused by earthquakes.

The following “highlights” were contributed by the partners:

- ARS: Hospital Innsbruck/ Austria (chapter 3.1/ D20)
- CESI: Assessment of historical bridges (chapter 2.1/ D20)
- LNEC: Operational modal analysis applied to physical models damaged at LNEC shaking table (chapter 4/ D20)
- RWTH: Assessment of Industrial Steel Structure (chapter 7.4.1/ D19)
- VCE: Monitoring of “Europabrücke”/ compensation of temperature and additional (moving) mass (chapter 2.3.2/ D20)

The above mentioned manual in two versions, a training version and a application version, will be elaborated mainly in the second year. At the end of the project the layout for an European Assessment Code will be available. The most innovative task of LESSLOSS/ SP5 is “update of vulnerability estimates via monitoring”, which was already started in the first year. The LESSLOSS SP5 -Training workshop will be held in Vienna in June 2007 with a duration of 2 days.