

Assessment of Interventions in Earthquake Prone Areas

DURATION: 2012 – 2013

TARGET COUNTRIES: Greece, Bulgaria, Romania

PARTNERS INVOLVED:

Coordinating centre : ECPFE Greece

Other centres: ECRP Sofia, Bulgaria , ECBR Bucharest, Romania

Other partners : European Council of Civil Engineers

OBJECTIVES OF THE PROJECT

Global objective for 2012-2013 :

The main objective of the proposal, belonging to the line of action: "Reduction of the Vulnerability ", will be the preparation of a document concerning Assessment and Interventions on Reinforced Concrete and Masonry Buildings. The document will take into account the Part 3 of the Eurocode 8, elaborating specific objects and facilitating its implementation. It will be complementary to EC8 Part3 and non-contradictory. Specific Case Studies will be included in the document in order to facilitate its application .To this end an international working committee composed by experts from selected European Centres specialized in the above topics will be established with the aim to prepare the relevant document. The Committee will work using mainly internet facilities, as only one or two meetings/workshops of the Committee per year may be envisaged. At the end of the second year a seminar will be held in order to disseminate the goals achieved.

Specific yearly objectives :

2012:

Collecting and sharing information on experience in Greece, Bulgaria and Romania and identification of issues that may cause differences in large scale practical application of EC 8 part 3 in each partner country;

2013:

Identification of needed changes in EC 8 part 3 and national regulations and proposing anticipated preparative in order to fulfil needs of coverage in conjunction with needs of safety and vulnerability data, coping with the European requirements. -

EXPECTED RESULTS

2012 :

State of the art of experience concerning the post-earthquake assessments and interventions in partner countries-

2013:

The specific of buildings stock and needs of vulnerability reduction in each partner country- the degree of detailing needed in interventions and/or strengthening design, in different stages of work

RESULTS OBTAINED PREVIOUSLY (if any)

Romania has adopted in the last years several national laws requesting and supporting the identification and the strengthening of buildings vulnerable to earthquakes (Law OG No. 20/1994, revised) as well as the upgrading of thermal comfort of buildings. The existing building stock in Romania and in many countries of Europe has various age, comfort and structural safety and reliability. The change of occupancy of buildings during the building lifespan, the cumulative structural damage produced by natural hazards and the upgrading of knowledge, standards and materials used for design of buildings and their technical equipment make the rehabilitation of buildings a major challenge for contemporary society in Europe. Since 2007 it was enforced the new Code P100-1 for seismic design. A new Romanian Methodology MEE 003-2007 for post-earthquake emergency investigation of safety of buildings and framework solutions of intervention, was enforced in 2007 by the Ministry of Regional Development and Tourism; the draft was coordinated by INCERC in collaboration with UTCB, IPCT and NCSRR. The enforcement of EC 8 part 3, as National Annex SR EN 1998-3: 2005 /NA 2009 raised some issues of correlation with the National Code P100-1 and with the new Romanian code P 100-3/2008 for seismic assessment of existing buildings. Thus, there is a need of a concerted approach, at least among S-E European countries.

RESULTS OBTAINED IN 2012

Work package 1 (prepared by ECPFE, ECRP, ECBR):

Description:

The formation of a scientific committee deployed by distinguished scientists nominated by the European Centres (ECPFE, ECRP, ECBR) and other Competent Authorities with main goal the syntax of a first draft of a document concerning Assessment and Interventions on Reinforced Concrete and Masonry Buildings for the design of structural interventions in Earthquake prone areas. The document will be complementary to EC8-part 3.

The members of the Scientific Committee will communicate via internet facilities.

At the end of 2012, a Workshop will be held in Athens, Sofia or Bucharest so as to present the relevant common work.

Associated deliverables:

ECPFE: A draft of the document in English.

ECBR: presenting the Romanian experience on post-earthquake investigations to derive observed vulnerability data, as they were carried out after March 4, 1977 earthquake; outline of the new Romanian Methodology MEE 003-2007 for post-earthquake emergency investigation of safety of buildings and framework solutions of intervention, enforced in 2007 and correlations with EC 8 part 3 needs of data.

ECRP:

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ECPFE

A Workshop on «Assessment of interventions in Earthquake Prone Areas» was scheduled for the end of 2012 in Athens, in order to disseminate the above work among distinguished Scientists from other European Centres, who will also deliver relevant presentations. The workshop has to be postponed to the beginning of 2013 (probably in March), due to the following reasons:

- a) Better organization among the partners of the Section «Reduction of the vulnerability» and invitation of experts from Europe, taking into account that the end of the year is always a rather «heavy» period for most academicians;
- b) Wider participation (of speakers as well as of engineers), since by mid-December a Workshop on «Seismic Protection of Monuments» was already scheduled.

The working Group (nominated by E.C.P.F.E. in collaboration with EPPO) who produced in 2011 the five first chapters of a non-contradictory complementary document (in Greek and in English) to elaborate specific objects and facilitate the implantation of EC8-Part 3, has produced in 2012 the draft of chapters 6 to 11 of that document "Code of Interventions (KAN. EPE), final harmonized Text" in English, namely:

Chapter 6: BASIC BEHAVIOUR MODELS

Chapter 7: ASSESSMENT OF BEHAVIOUR OF STRUCTURAL ELEMENTS

Chapter 8: DESIGN OF INTERVENTIONS

Chapter 9: SAFETY VERIFICATIONS

Chapter 10: REQUIRED CONTENTS OF THE DESIGN

Chapter 11: CONSTRUCTION – QUALITY ASSURANCE - MAINTENANCE

ECRP

The main objective of the planned activities will be the preparation of a "Regulatory document for the design of structural monuments in earthquake prone areas". The preparation of the above Regulatory document was supposed to be based on the relevant documents, already created in Greece and Italy. In particular, a first document (elaborated on the proposed topic by EPPO-ECPFE in collaboration with the Hellenic Ministry of Culture and Tourism) constitutes a basis of further development of the Scientific Committee proposed to be established with the participation of experts from the Project Coordinating Centre and Partner Centres. As proposed by the Coordinating Centre, ECRM has submitted candidatures from Armenia to the Project International Scientific Committee and began to assemble a working group from relevant specialists. Awaiting an English version of the above draft "Regulatory document", ECRM in 2012 within the Project has carried out researches addressing two directions.

In the first direction, an array of analyses were conducted of the existing legislative and regulatory documents of the Republic of Armenia dealing with seismicity and seismic resistance of constructions in general, as well as the availability in the above mentioned documents of the elements, concerning structural interventions in monuments in earthquake prone areas, in particular.

In the second direction, some comparative analyses were conducted of comparing the legislation of the Republic of Armenia with that of the European Union in the field of Civil Protection and Disaster Risk Reduction, in general, from a point of view of clarifying the coincidences and discrepancies existed in approaches to their formation; specifying some fundamental structural and contents related discrepancies in legislation and proposing the ways towards harmonization of the legislation of Armenia and that of the European Union in the above field.

Our work would have become more effective had we got an extended summary in English of the "Draft framework Regulatory Document for structural intervention to and seismic protection of monuments", which is called to serve a basis for our common work, or would have allowed to make at least a first step towards it, in case we have received a short "Annotation" in English of the mentioned document. At receiving of the above documents, we will immediately start translating them from English into Armenian and to continue target work with the involvement of the experts from Armenia on analyses of the documents, comparing them with the Provisions of the Armenian Legislation in the above field being analysed by ECRM in 2012 within the Project, and development of relevant suggestions.

ECBR

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ACTIVITIES PLANNED IN 2013 (split by partner)

Working package 1 (prepared by ECPFE, ECRP, ECBR)

Description:

Elaboration of Case Studies so as to check the applicability of the document and finalization of the Document.

The members of the Scientific Committee will communicate via internet facilities. At the end of 2013, a Seminar will

be held in Athens, Sofia or Bucharest so as to present the goals achieved.

Associated deliverables:

ECBR: comparisons between the requirements of Romanian code P 100-3/2008 for seismic assessment of existing buildings and EC 8-part 3, vs. EC 8 requirements for newly designed buildings. case studies in using analytical assessments and calibrating them with field inspections and measurements of dynamic characteristics of buildings made of concrete and masonry and according with different codes, as to derive vulnerability patterns

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