

# “The need for integrating Structural / Seismic Upgrade of Existing Buildings, with Energy Efficiency Improvements”

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## 1. Summary

The majority of the existing building stock in many countries of the EU, suffers from deficient or total lack of seismic resistance and at the same time from poor energy efficiency.

Given that buildings in some of these regions also experience frequent seismic activity and high temperature variations, it becomes a necessity to proceed with upgrading or retrofitting measures as part of a major refurbishment process.

These measures are expected to improve the resilience of the existing building stock in an economically feasible way, reduce the operational expenses and contribute to the sustainability of the society and the environment and offer safer buildings to people.

Current practice prescribes and promotes upgrading solutions that isolate each deficiency and proposes solutions to enhance/upgrade each of the two items (either energy efficiency improvement or structural seismic upgrade) separately.

As it is well known if buildings are cladded and insulated, then they may look new but their underlying structural issues remain, hidden, unseen and unassessed and may become life-threatening, especially in case of a major seismic event leading to a collapse.

If that occurs, all EU money spent for energy Upgrades and refurbishment would be lost. However, the economic risk is redundant compared to the potential injury and loss of life.<sup>3</sup>

In order to raise awareness on that, we have to find and compare the numbers that were needed to fix or rebuild houses and damaged infrastructure after a real major earthquake event for different countries (in a pure economic sense) and for that we need a lot of data regarding the earthquakes in Turkey, Italy, Greece, Slovenia and Cyprus lately.

This database of repair and replacement costs will be a strong indicator of the benefit from pre-earthquake seismic resistance upgrading of existing buildings.

## 2. Description of project

Our goal is to produce a comprehensive, "simple", engineering practice oriented position paper in a Common/easy to read language that should emphasize on the need to structurally upgrade existing buildings when they will be Energy Upgraded.

It is a necessity to raise Awareness for the problem of safety of the existing building stock. Safety is one of the six essential requirements mentioned in the Eurocodes and may be the most important one, as it defines which buildings are safe, sound and secure to live in.

When we obtain all the data formally and officially, then we can introduce it in our position paper and present them in ECF, Brussel, to the Commissioner and then to EU engineers and organizations.

We need to find a way, so that EU funding must be given for work on structural assessment, strengthening and upgrade as well as energy efficiency work.

**Decision-makers need to comprehend the huge responsibility undertaken when ruling that energy efficiency measures only, would be funded by the EU.**

The new trend is ... *smart financing for smart buildings.*

But, a building can only be called smart once it is safe and secure.

The starting point for the project could be state/government buildings and then buildings of high importance (as categorized in the Eurocodes) as well as buildings that concentrate, or used or visited by a lot of people.

Subsequently when the position paper is finalized and published and is widely understood and accepted then we can proceed to the second part/second position paper which will be more scientific and/or Academic and deal with:

- (a) Proposal of standard assessment methods in order to assess and review the level of safety of existing buildings.
- (b) Establish criteria for target performance level of the selected materials and solutions for the seismic performance of buildings and for the energy refurbishment of buildings.
- (c) Identify both innovative and traditional materials that are technically capable of providing both seismic and energy upgrade of an existing building and ways to combine them.
- (d) Assess and identify the current situation in the EU countries regarding the issue and whether they have any special policy or guidelines for that.



## 3. Scope:

The aim is to ensure sustainability, resilience and safety of existing buildings through structural upgrading against seismic actions and enhanced energy efficiency. The solution should follow a holistic approach to address these issues simultaneously and link individual retrofit/upgrading activities in an integrated procedure. One of the most important issues, which defines the way of living, is safe, sound, and secure buildings.

That is why there is a need to create a strong position paper, in order to convince E.U. member states and Brussels to grant funding for the Structural and / or Seismic Upgrade of the buildings, before, or at least together with, the grants given for the upgrade of the energy performance of buildings, under Directive 2010/31/EM, of the European Parliament and of the Council of 19th of May 2010.

Then, if the relevant position paper is accepted and finalized, we will disseminate it in various ways (conferences, publications, media presentations, national professional boards, etc.) to raise the attention and ensure its continuation as a major European study.

**Lobbying is necessary in order for politicians and other people of influence, who are ALSO decision makers, to understand the necessity of “The need for Structural / Seismic Rehabilitation of Existing Buildings, in parallel with Energy Efficiency Improvements”.**

## 4. The working team:

Contribution of all countries members of ECCE is needed, and many countries may have experts and Professionals that can contribute in the preparation and appraisal of the position paper.

### The Basic Coordination Team is:

- a) Eur. Ing. Platonas Stylianou - Cyprus (Coordinator of the working team)
- b) Mr. Aris Chatzidakis - Greece
- c) Mr. Andreas Theodotou - Cyprus
- d) Dr Nicolas Kyriakides - Cyprus
- e) Mr. Daniel Bitca - Romania
- f) Mr. Andreas Brandner - Austria
- g) Dr. Branko Zadnik - Slovenia
- h) Pr. Massimo Mariani - Italy

## 5. Expected Benefit:

1. Raise awareness of, and demand for, better and structurally sound buildings among stakeholders, owners, operators and all citizens.
2. Improve knowledge and information regarding assessment and design for structural and/or seismic upgrading of existing buildings.
3. Increase funding opportunities from EU for related projects.
4. Offer a significant contribution to the community, as the need to protect the homes and build property is a basic one that originates from antiquity.

By applying the idea expressed in the position paper, countries that possess abandoned, deteriorated or ill-maintained buildings, especially those subject to seismic hazard, can assess, evaluate and if necessary, structurally strengthen their buildings, in order to obtain the same or better structural capacity than what was mandated by the building codes and allowed by the construction practices at the time of the original construction.

Countries subject to seismic hazard can assess, evaluate and if necessary, structurally and seismically strengthen their buildings in order to obtain the necessary structural capacity according to the current Eurocodes, National Regulations and Annexes.

According to clause 16, of the EU Directive 2010/51/EU,

“...major renovations of existing buildings, regardless of their size, provide an opportunity to take cost - effective measures to enhance energy performance (here we must add ... and structural / seismic performance..., in order to achieve our purpose). Member states should be able to choose to define a ‘major renovation’ either in terms of a percentage of the surface of the building envelope or in terms of the value of the building...”

If, in Article 7, Existing Buildings, of the Directive, “...when buildings undergo major renovation, the energy performance of the building or the renovated part thereof is upgraded in order to meet minimum energy performance...”, **we add ...and “evaluated and assessed for structural and/or seismically capacity and upgraded accordingly”**,

then as the European Council of Civil Engineers we will contribute to a much safer community with improved sustainability and lower waste of resources.

## 6. Action Plan:

To perform a preliminary study among ECCE members through a questionnaire in order to collect information and professional opinions concerning the current situation on the topic in their countries and establish the current standard practice. The material received will be processed in the form of a database and taken into account in the formation of the position paper.

We will record goals, collect data and comments from all the countries members of ECCE and we will prepare the draft position paper.

Receive comments from the ExBo and any other expert needed / employed by ExBo. Prepare the final draft, to be delivered in ten to eleven months if possible.

The target is to publish the position paper, within a year after acceptance of the position paper proposal.



## 8. Dissemination of the Position Paper

- EU Commission and Parliament Members.
- ECCE member organizations.
- ECCE Website.
- EU Chamber and Civil Engineering Association.
- Universities / Schools of Engineering.
- Addressed to those who are responsible for the right decision.

MOTO:

**INTELLIGENT / SMART BUILDINGS =  
SAFE and SECURE BUILDINGS**

**Or**

**“ Safety should be an integral part of the early design of intelligent buildings and not an afterthought. ”**

**THANK YOU FOR YOUR  
ATTENTION !!!**