

IRCC Workshop Malmö Wednesday the 4th of June 2014 (SPAIN)

The basis for THE design and calculation for a building like the one proposed (multi story apartment building), accordingly with the requirements, are set in the Spanish Building regulations: Building Code (CTE), Norm for Concrete Structures (EHE) and Norm for Steel Structures (EAE). Basically they are similar to the ones of the EU member states as far as they derive from the EU CPD, then CPR and the Structural Eurocodes. The basic requirements are CTE SE1 Mechanical resistance and stability, CTE SE2 Fitness for service, and for the verification of the fire resistance there the CTE SI6 Fire resistance of structures.

In the practical level, buildings must be designed to bear the loads as defined in relevant standards. For normal situations, action loads are defined in CTE SE-AE of the building code. To check the fire resistance as an accidental load, they are set in CTE DB SI Safety in case of fire of the CTE Building Code.

In case of a building placed in a seismic area (Spain is seismic-prone country in some regions), actions defined in NCSE Standard for anti-seismic construction in building must be taken into account.

Methods for verifying the structural safety are set in the rest of the regulations. Alternative methods can be used, as those offered by Eurocodes provided that the basis for design and calculation are similar to those of the CTE DB SE Structural safety. Other methods based in real tests and probabilistic formulations are also accepted.

Each IRCC member country is invited to give a short presentation (10 minutes + 5 minutes for questions) on the subject. We understand that the regulations can differ widely depending on what is built. To be able to compare between IRCC countries please describe in your presentation, in general terms, what applies to a five story apartment building in your country. We have listed some questions below as a “guide” to be used when you prepare your presentation. Feel free to bring up other issues if relevant to the subject.

Some guidance for the presentation:

- How is it verified that the requirements in the building codes are met?

The designer can justify that requirements are fulfilled if the methods provided by the Part II of the Building Code CTE are used.

Who verifies that the requirements are met?

Generally there is no external verification apart from the one provided by the designer or the owner. For works where a compulsory insurance is required by the Building Act (that is the case for an apartment building), the promoter of the works has to get an insurance policy, and the insurance companies asks for a check made by an independent third control company (named as OCT Oficina de Control Técnico, in Spanish) that checks the documents and provides a conformity report with or without non-compliance remarks. The OCT does not re-calculate the design. They use their own internal procedures to issue the conformity report to the insurance company. In case of non-

compliance the designer must solve them or otherwise the works will not be insured, that means that they cannot put in the market.

- What design documents in terms of drawings, calculations etc. shall be presented to the authorities or other control bodies?

The design documents must include at least a Memory with specifications, instructions for use and maintenance plan.

All calculations must be properly justified in the documents. They must content furthermore those requirements provided in the specific norms (Concrete, Steel...), at least the following:

- a) Foreseen service-life if differs from 50 years
- b) Simplifications made to transform the building into one or several models of calculation, that must be detailed specifying the one chosen for the whole structure and its parts, sections, type of connections and bearing conditions.
 - Mechanical characteristics taken into account for structural materials, for the ground that bears the building or acts on it.
 - Global geometry (specifying the dimensions to reference axis) and elements that may affect the behavior or durability of the structure.
 - Requirements with regard to the bearing capacity and fitness for the use included the durability, if they differ from those set in the regulations.
 - Load actions, combinations considered and partial safety factors used.
 - For each structural element mode of analysis made and calculations methods used.
 - In any, foreseen quality control adopted.

The drawings included in documents must content all information required to execute the works. That includes detailed drawings of all structural elements and auxiliary elements.

Any restriction of use must be justified as well, if any, or particular instructions for inspections and maintenance. All elements not having structural use but with a particular finality related to the structural system in both permanent or accidental situation, must be also defined.

- When shall the design documents be presented?
- Before the construction start?
- Continuously during the construction?

The project documentation must be delivered before the works commencement, normally when the building permit is asked to the relevant authority. The maintenance plan and instruction of use are delivered when the works are to be handed out to the owner (developer).

During the construction phase all incidents happened must be registered in the "Works book" where all materials used in the works must be registered also.

- What are the requirements regarding documentation of:
- Controls by authorities, consultants and project managers?

- design calculations?
- building materials used?

As said before, an external control can exist although it is not always compulsory because it depends on the type of building. Local authorities are allowed to perform anyway any checking of all projects but in reality they just limit to check the fulfilment of the land planning ordinances, and in some big towns the fire requirements are also checked.

- What qualification should structural designers and fire safety engineers have?

Architects are the normally the professionals who take the responsibility of apartment building design, included structural design although it is normal that they can hand out this responsibility to a structural engineer or hire their services. There is no an official figure of the fire engineer.

Certifications on a national or regional levels or are there no such requirements?

The professional title of architect or engineers is nationally valid.

What minimum formal education shall they have?

Master, as per the current European terminology (Bologna)

- What other requirements do you have regarding verification, documentation and control during the design phase?

For a project like the one proposed for this Workshop generally none.

Fulfilled by Javier Serra

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