

10.9.2012

Problems related to harmonised product standards of precast concrete products

There are still problems related to harmonised product standards of precast concrete products. These problems mean that harmonised product standards of precast concrete products do not create a solid basis for internal market. In contract, CE marking based on these standards is in reality national CE marking. There is a need to improve the situation. The main problems are listed in this letter but the list is not exhaustive. Proposals are also given how to improve the situation.

1. List of harmonised product standards (hENs)

Our comments are valid for most of the hENs for structural precast concrete products.

- EN 1168 Hollow core slabs
- EN 12737 Floor slats for livestock
- EN 12794 Foundation piles
- EN 12839 Elements for fences
- EN 12843 Masts and poles
- EN 13224 Ribbed floor elements
- EN 13225 Linear structural elements
- EN 13693 Special roof elements
- EN 13747 Floor plates for floor systems
- EN 13978-1 Precast concrete garages
- EN 14843 Stairs
- EN 14844 Box culverts
- EN 14991 Foundation elements
- EN 14992 Wall elements
- EN 15037 Beam-and –block floor systems
 - Part 1: Beams
 - Part 2: Concrete blocks
 - Part 3: Clay blocks
 - Part 4: Expanded polystyrene blocks
- EN 15050 Bridge elements
- EN 15258 Retaining wall elements
- EN 15435 Normal weight and lightweight concrete shuttering blocks
- EN 15498: Wood-chip concrete shuttering blocks

prEN 15037-5 Beam-and-block floor systems - Part 5: Lightweight blocks for simple formwork is under approval.

2. Problems related to CE-marking methods 1, 2, 3a and 3b

Interpretation of CE-marking methods 1, 2, 3a and 3b varies in hENs for structural construction products when hENs are prepared e.g. by CEN TC 124 (timber structures), TC 135 (steel structures), TC 177 (prefabricated aerated concrete components) and TC 229 (precast concrete products). Common approach is needed. Finland has asked solution to this problem several times.

In addition CEN TC 229 uses two different interpretations in its hENs. Part of the published hENs in force covers CE-marking methods 1, 2 and 3 without dividing methods into 3a and 3b. The other part includes all methods 1, 2, 3a and 3b. This has created additional problems in the Member States.

Commission has informed that it will take the Guidance Papers away from its NANDO web site when CPR will come into force. That is why CEN has decided to draft CEN construction sector guidance document for structural construction products. The guidance of CEN is under preparation (see draft TF N 548). We hope that the guidance will solve these problems when hEN will be revised to be in accordance with the CPR.

3. Reference standards

Harmonised product standards of precast concrete products refer to EN 13369 *Common rules for precast concrete products*. In chapter 4.1 of EN 13369 *Material requirements* the following general requirements are presented:

"Only materials with established suitability shall be used.

For a particular material, the establishment of suitability may result from an European Standard which refers specifically to the use of this material in concrete or in concrete products; in absence of an European Standard it may also result, under the same conditions, from an ISO standard.

Where this material is not covered by an European or International Standard, or if it deviates from the requirements of these standards, the establishment of suitability may result from:

- the relevant national standards or provisions valid in the place of use of the product which refer specifically to the use of this material in concrete or in concrete products;

or

- a European Technical Approval specifically for the use of this material in concrete or concrete products."

Action: Speed up the standardization process.

EN 13369 is not a hEN but it is essential part of the hEN package of precast concrete hENs. Unfortunately EN 13369 includes Annexes some of which are informative. How to give coherent CE-marking declared values if part of the rules related to CE-marking are given in informative Annexes which may be overruled by national rules.

Action: EN 13369 shall not include informative Annexes.

EN 13369:2004 refers to EN 206-1 *Concrete – Part 1 :Specification, performance, production and conformity* which is not a hEN. It also refers to the following reinforcing steel draft standards:

prEN 10080, *Steel for the reinforcement of concrete - Weldable reinforcing steel - Part 1: General requirements*.

prEN 10138-1, *Prestressing steels - Part 1: General requirements*.

prEN 10138-2, *Prestressing steels - Part 2: Wire*.

prEN 10138-3, *Prestressing steels - Part 3: Strand*.

prEN 10138-4, *Prestressing steels - Part 4: Bars*.

And concerning stainless steel reinforcement reference is made to national standards valid in the place of use. ECISS TC 104 is preparing a hEN for reinforcing steel (no prEN number yet) and it will take years before it will be available.

Because concrete and reinforcing steel products are very important there are usually national approval systems for these products. Concrete and reinforcing steel products are used also in situ concrete structures.

Reinforcing steel standards

The development of hENs for reinforcing and prestressing steels has been very slow.

EN 10080 *Steel for the reinforcement of concrete - Weldable reinforcing steel- General* was published 2005. It was cited in the OJ but the Commission decided to withdraw it from the OJ. The development of the new version has not been satisfactory. See enclosed the Finnish comments on its problems (letter 10.11.2011).

Prestressing steel standards i.e. prEN 13108 series and stainless steel reinforcing steel standard are still under drafting.

Member States have developed their own national approval system based on national standards.

Action: Speed up the standardization process.

Ready mix concrete

Ready mix concrete is covered by EN 206-1 *Concrete – Part 1: Specification, performance, production and conformity*. This standard is widely used in the Member States. This standard applies to concrete for structures cast in situ or for precast products in buildings and other civil engineering structures. The Commission proposed a mandate for ready mix concrete many years ago. The proposal was rejected mainly by FIEC. One of the main reasons was that the hEN would cover also concrete which is produced and cast on site.

The CPR has now resolved this problem. According to article 5(a) of the CPR the following construction products do not need DoP and CE-marking.

“(a) the construction product is individually manufactured or custom made in a non-series process in response to a specific order, and installed in a single identified construction work by a manufacturer who is responsible for a safe incorporation of the product into the construction works, in compliance with the applicable national rules and under the responsibility of those responsible for the safe execution of the construction works designed under the applicable national rules.”

Many national choices and methods are allowed in EN 206-1 because it is not a hEN. The following list of these national choices and methods is based on prEN 206:2012 which is now in CEN enquiry.

- National deviations from the standard are allowed
- Member States may use own exposure classes related to environmental actions
- Member States may use own criteria to fulfill the requirements of exposure classes

- Member States may have own requirements for constituents
- Member States may have own rules for use of additions
- Member States may have own rules for use of cement content and water/cement ratio
- Member States may have own rules for frost resistance

These national choices and rules mean that precast concrete products with the CE marking cannot be used in other Member States unless national requirements and rules valid in the place of use are fulfilled.

There is an urgent need to have a harmonised product standard for ready mix concrete.

Action: The Commission shall draft a mandate for ready mix concrete.

Admixtures

Harmonised product standard EN 934-2 *Admixtures for concrete, mortar and grout – Part 2: Concrete admixtures* does not cover all admixtures and their properties. For example the following admixtures are not covered (all are not relevant for precast products):

- Admixtures for low temperatures (prevents freezing of the concrete until adequate strength is achieved)
- Stabilizers for self-compacting concrete
- Admixtures for underwater concreting

Harmonised product standard EN 450-1 *Fly ash for concrete* covers the fly ash coming from burning of coal and allows only limited use of other co-combustion materials (< 20%). Use of the biomass and biofuels in energy production is increasing rapidly due environmental reasons and EN 450-1 should cover also fly ash coming from these renewable combustion materials, if this use is technically acceptable.

Action: The scope of these two standards should be made larger.

4. Missing reference standards

There are many incorporated products which are used in precast concrete products:

- bolt connections for columns, beams and walls
- fastening plates and other steel parts for fastening of adjoining structures
- steel corbels and adjoining parts in horizontal structures
- balcony connectors
- ties and pins for external walls
- loops for connecting adjoining walls

These products do not have hEN and are approved nationally. Almost every precast product contains one or more above mentioned products (except hollow core slabs and floor plates).

Lifting devices (i.e. inserts and loops) are also problem for internal market. They are considered to be outside of the scope of CPR. Lifting devices are usually nationally approved.

Conclusion: Because of problems mentioned above manufacturer of precast concrete products have to know a lot of national practices in addition to CE-marking. The national practices create very

effective technical barriers to trade. National practices may prevent also the use of results of research work carried out in other Member States.

5. Deficiencies in harmonised product standards of precast concrete products

Precast product standards do not always cover all used material and their properties. I.e. hollow core slabs and floor plates are commonly delivered with thermal insulation. CE-marking does not include thermal properties or reaction to fire of thermal insulation.

Action: Improvement of hHNs to cover all material and their properties.

6. Missing harmonised product standards of precast concrete products

The scope of harmonised product standards of precast concrete products is sometimes very narrow and products which intended use is same as in the standard are not covered due to i.e. shape of the product or products are out of the scope if loading is different. Some products do not have hEN at all. For example reinforced solid slab elements are not covered by the hEN's although the manufacturing process is very similar to columns and beams.

Action: TC 229 shall check gaps in precast concrete products and develop new standards or amend to existing standard to cover these gaps.

7. Missing standards for relevant products in erection of precast product structures

In erection stage the joints between structural precast products are usually grouted. EN 206 covers ready mix grouts but a hEN is needed for dry mix grouts.

Action: The development of new standard should be started in TC 104.

8. Problems in structural bearings

Elastomeric bearings are used in supports of precast concrete structures. There is a harmonised product standard EN 1337-3 *Structural bearings – Part 3: Elastomeric bearings* covering elastomeric bearings. Standard EN 1337-3 is dealing mainly elastomeric bearings from point of view of bridges. Design methods given in EN 1337-3 are not applicable for buildings and the design rules will lead to much more larger bearings than the current practice. Thus TC 167 has decided to prepare separate design methods for elastomeric bearings used in buildings.

Short term action: The scope of EN 1337-3 shall be limited only to bridges if suitable design rules are not possible to accept before 1.7.2013.

Long term action: Design methods which are suitable for elastomeric bearings in buildings shall be developed in CEN/TC 167 as fast as possible and shall be incorporated into EN 1337-3.

Matti J. Virtanen

Head of the Finnish Delegation to SCC