Coming CEN and ISO standard for the execution of concrete structures

Dansk Betonforening
København, oktober 2007

EU & EFTA 30 nations, some 480 mill citizens
Why standardisation on a European level?

.. to facilitate free flow of goods and services

To achieve this, the EU Commission has issued:

- Commission decision of 1985 “New Approach” (Attestation of Confirmity)
- Construction Products Directive - CPD, from 1989 (89/106/EØF)
- Directive on Public Procurement (98/4/EC)

**CPD**

All construction products placed on the market have to fulfill the 6 “Essential Requirements”:

1. Mechanical resistance and stability
2. Safety in case of fire
3. Hygiene, health and the environment
4. Safety in use
5. Protection against noise
6. Energy economy and heat retention

The fulfillment has to be declared by an “Attestation of Conformity” from the producer
To realize this ambition, the Commission has made an agreement with the European Committee for Standardization, CEN, to transfer the 6 ER into operational standards.

This programme includes the "EuroCodes"
"Execution of concrete structures"
(Concrete related activities on a building site)

First generation of European concrete standards:
- ENV 206-1:1990 (Concrete, production)

... together embedded the provisions for site activities
To reflect the normal split of work between the different actors in the construction industry, a new hierarchic structure was launched in the 1990s.
Construction Products Directive (CPD) + National legislation

Eurocode - 0
Basis of structural design

Eurocode - 1
Actions on structures

Eurocode - 2
Design of concrete structures

ENV 13670
Execution of concrete structures

EN 206-1
Concrete

prEN 10138 or ETA
Tendons & PT kits

EN 10080
Reinforcement

prEN 13670
Prefabricated elements

The revisions of the coming European execution standards for concrete aluminium and steel works are all coordinated.

Concrete
31 + 29 pages

Steel
Total 214 pages
Both the EU Commission and CEN respects the national authority on certain issues as:

- “level of protection”
- Climatic and geographical differences
- Needed skill of workforce
- etc

Present (or near future) situation in 30 European countries
The Execution Specification according to EN 13670 will comprise provisions on 3 levels:

- Provisions identical for all European sites → EN 13670
  +
- Provisions identical within a member state → National annex
  +
- Provisions unique for each construction site → “Project Specification” i.e. (choice of classes, drawings etc)
Quality Management

- Execution class 1, 2 and 3 based on the importance of the structure
- The Execution class includes inspection and might include planning
- The Execution classes are in accordance with Eurocode-0 and are coordinated with the steel and aluminium sector (prEN 1090)
- Further detailing to be given in the national annex

Competence of site staff and personnel

Norwegian requirements to:

- Production leader
- Foreman
- Worker
- Welder
- Prestressing
- Erection of elements
- Control
### NS 3465, Kap. 5
"Arbeidsledelse og personale"

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**Formwork**
This section is prepared in close cooperation with fib commission 9

- This section in particular focuses on corrosion protection of PT-systems
- This section reflects the latest international state-of-the-art as reflected in recent fib-documents
Prestressing

Reference to
EN 445: 2007
EN 446: 2007
EN 447: 2007
On grouting

Informative reference to
CEN Workshop Agreement CWA 14646:2003 “Requirements for the installation of post-tensioning kits for prestressing of structures and qualification of the specialist company and its personnel”

River Schelde bridge, Belgium
Collapsed in 1992
New Holmenkollen
JDS Architects, Vesterbrogade, CPH
Concreting

§ 8.5.3 - SCC

"......Working procedures for the actual cast shall be established based on the constructor’s experience and/or pretesting, to enable the required compaction to be obtained. Additional requirements to those given in EN 206 to the fresh concrete properties and its conformity criteria shall be agreed with the producer”

Self Compacting Concrete
Concreting

Curing Class 1    -  --
Curing Class 2    -  35 %
Curing class 3    -  50 %
Curing class 4    -  70 %

Curing

Precast elements
Geometrical tolerances are given in 2 levels

- Level 1 are the “design assumptions” on which Eurocode-2 is based.

- Level 2 are those with relevance for serviceability and placing compatibility, but with limited structural influence.

There have been some negative reactions to abandon well-operating national standards.
The draft prEN 13670 has just passed the public inquiry among the CEN members.

Only 2 of 30 member states signalled a negative vote.

53 pages with comments. No one considered as problematic.

The committee, TC-104/SC2, will consider the received comments during this autumn/winter.

The standard is expected to go for Formal Vote in 2008.

When published, it will serve as THE specification for annually some 350 000 000 m³ concrete and related formwork and reinforcement.

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- Some comments on the quality management regime (a quality plan shall be required)
- Some suggestions for additional detailed provisions concerning prestressing
- Some suggestions on “concreting” (curing, SCC, temperature differences)

Some of the comments reflect the lack of DK participation in SC-2 as the text has already been subject to careful balance between the MS, some comments should be taken care of by a DK national annex

According to EU’s directive on public procurement all public (or public controlled) agencies or organizations are forced to abandon their traditional technical specifications and be loyal to the new CEN standards, including the EN 13670.

This includes also national road administrations
ISO is the “umbrella” for 158 national standardization bodies.

An ISO standard is only mandatory if the national standardization body has implemented it as national standard, for instance as DIN-ISO, BS-ISO etc.

ISO and CEN formed in 1991 the “Vienna Agreement” for cooperation.

On parallel documents, either ISO or CEN shall take the lead.
ISO TC-71 “Concrete” (secretariat ANSI/USA under Gene Corley) is dealing with design, materials and execution of concrete structures

- Basis of Design
  ISO TC 98
- Design of Concrete Structures
  ISO TC 71
- Execution of Concrete Structures
  ISO TC 71 / SC-3

Concrete
ISO TC 71 / SC-3
Reinforcement
ISO TC 17 / SC-16
Prestressing
ISO TC 17 / SC-16
Prefabricated concrete products

Product and test standards for the constituent materials

International Organization for Standardization

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

fib
CEB-FIP
SKANSKA
ISO 2394 “General principles on reliability for structures” formed the basis for Eurocode-0, and together with fib Model Code, the basis for Eurocode-2.

ISO TC-71 asked in 2001 fib to work out a Model Code on Service Life Design of Concrete Structures.

Fib TG 5.6 got its document approved by fib General Assembly in 2006.

ISO TC-71 appointed me to chair a committee responsible for implementing fib MC SLD as an ISO standard at its meeting in Brazil this June.
CEN EN 206-1:2000 “Concrete” formed the basis for ISO 22965:2007 “Concrete”

ISO/WD 22966 “Execution of concrete structures”

CEN draft prEN 13670 forms the basis for ISO/WD 22966:2006 “Execution of concrete structures”.

Standard Norge chair this work