Process for the implementation of the Eurocodes in the national regulatory framework; guidance and best practices in Bulgaria

Iren Dabizheva

Managing Director of Bulgarian Institute for Standardization

POLICY

- **Bulgarian Institute for Standardization (BDS) and Ministry of Regional Development and Public Works (MRDPW) manage and provide together the national policy of the Bulgarian government for implementation of European Standards under the CPD/CPR - Structural Eurocodes, Harmonized ENs and Supporting ENs, including determination of the Nationally Determined Parameters (NDPs) in respect to specific geographic, climatic and seismic conditions.**

POLICY

Technical Rules and Regulations Department at the Ministry of Regional Development and Public Works is responsible for:

- **full implementation of CPR in Bulgaria; management of the creation of the National system of Conformity Assessment of construction products and designation of Approved and Approval Bodies (Notified Bodies).**
- **Organization and management of the elaboration of technical normative regulation for design and execution of building works, including structures, water-supply, sewerage, gas-supply, heating and ventilation systems and electrical installations**

GENERAL STRUCTURE OF THE BULGARIAN LEGISLATION

The legal framework for elaboration of all technical rules and regulations related to design and execution of construction works is as follows:

- **Spatial Planning Act (SPA)**
- **Law on Chambers of Architects and Engineers in the Investment Design**
- **Law on Technical Requirements to Products**
- **Law on National Standardization**

TECHNICAL COMMITTEE BDS/TC 56 "DESIGN OF BUILDING CONSTRUCTIONS"

The Technical Committee BDS/TC 56 "Design of building constructions" was created in 1993 as a mirror committee on CEN/TC 250 and was initiated by the National center of construction (NCC).

Till the year 2000 the activities of the TC 56 have been executed from NCC but after his closure (because of economical and other reasons) the institution which proceed the work in this area and provided financial support for translation and technical editing of the Eurocodes is the Ministry of Regional Development and Public works.

TECHNICAL COMMITTEE BDS/TC 56 "DESIGN OF BUILDING CONSTRUCTIONS"

Active participation in the activities of the BDS/TC 56 concerning the adoption of the European Standards by experts from:

- **Technical Rules & Regulations Department - MRDPW**
- **University of Architecture, Civil Engineering and Geodesy /UACG/**
- **High School of Building "Luben Karavelov"**
- **Varna Free University, Faculty for Architecture and civil engineering**
- **Central Laboratory for Seismic Mechanics & Earthquake Engineering in Bulgarian Academy of Science**
- **Research Institute for Civil Engineering**
- **Bulgarian Scientific and Technical Union of Civil Engineering**
- **National Agency "Road Infrastructure"**

TECHNICAL COMMITTEE BDS/TC 56 "DESIGN OF BUILDING CONSTRUCTIONS"

- Bulgarian Chamber of Engineers in the Investment Design
- National Railway Infrastructure Company
- Companies for production of building materials, as Knauf, Wienerberger etc.
- Independent Experts

STATUS OF EUROCODES IN BULGARIA

All parts of ENV Eurocodes (61) have been translated in Bulgarian language and have been adopted as national standards. They have been published in the BDS Official Journal and can be found in the library of BDS (without National annexes).

The Engineering community has the opportunity to be acquainted with the ENV Eurocodes content and on this base to perform comparative calculations and design between ENV Eurocodes and Bulgarian Norms.

From the year 2003 Bulgaria started the process of adopting the Eurocodes in phase EN.

STATUS OF EUROCODES IN BULGARIA

All 58 parts of Eurocodes are implemented as Bulgarian standards BDS EN

All parts are translated into Bulgarian language and have been published from 2003 (BDS EN 1990) to 2013 (BDS EN 1999)

All National Annexes have been published from 2011 to 2013

In 2014-2015 all National Annexes have been putting under systematic review. Several National Annexes have been revised and have new editions.

NATIONAL ANNEXES AND NDPs

National Technical Committee BDS/TC 56 is structured like CEN/TC 250 – with 9 standing works groups (SWG) which are mirror to SC`s and 2 horizontal groups – "Fire" and "Bridges"

- **In SWG have been involved prominent experts and professors from theory and practice in building engineering in Bulgaria**
- **They have been appoint with determination of NDPs to Eurocodes**
- **The most of NDPs have been determined in a expert way**
- **For near 80% of NDPs have been accepted recommended values and classes, except climatic actions**
- **For determination of some NDPs have been made comparative calculations**

NATIONAL ANNEXES AND NDPs

During last 10 years have been modified some of national Ordinances for structural design drawing closer to Eurocodes principles. Since 2004 in Bulgaria operates Ordinance Nr. 3 *Basis of structural design and actions on structures*. It implements in general EN 1990 and the parts of EN 1991

NDPs in EN 1990 and EN 1991 were considered with this Ordinance and with national experience, for example values for ψ - factors and γ - factors

The new seismic hazard map and maps of snow loads, wind and temperature have been prepared, with financial support of Ministry of Regional Development and Public Works, by a team of prominent experts, mainly from Bulgarian Academy of Science

NATIONALLY DETERMINED PARAMETERS FOR EUROCODE 8

As Bulgaria is one of zones with highest seismic hazard in Europe, particular attention have been paid to Eurocode 8.

Some data about the preparation of National Annexes to the Eurocode 8 parts (from the report "Definition of the National Parameters of the Eurocode 8" delivered at the Balkan Seminar on earthquake engineering, 9-10 October 2009 in Sofia)

- **The total number of Nationally Determined Parameters in Eurocode 8 is more than 150. For nearly 80% of the NDPs the recommended values and classes were accepted but only after profound research and comparative calculations were made.**

NDPs for EN 1998-1 *General rules*

- **Attention has been paid to the parameters related to the definition of seismic action. Data for the earthquakes from the seismic source in the Vrancha Mountain have been collected and a specific response spectrum has been developed. The territory to which this spectrum will applied have been defined on the new Bulgarian seismic map**
- **Values for the referent return period of seismic action for the no-collapse requirement as well as for the damage limitation requirement have been accepted due to the necessity for a harmonized approach to seismic hazard in all European countries.**
- **Only horizontal elastic response spectra type 1 was adopted in Bulgaria because the type 2 spectra are not typical for the local conditions**

NDPs for EN 1998-2 *Bridges*

- For 5 of all the 30 NDP`s have been proposed values and additional descriptions different from those recommended in EN 1998-2 on the basis of comparative calculations
- The proposals are balanced between the safety of the bridge and the higher expenses, taking into account the local conditions
- The definitions of the importance classes for bridges are more detailed on the basis of traffic capabilities, route importance, bridge height and fast traffic recovery capabilities

NDPs for EN 1998-3 *Assessment and retrofitting of buildings*

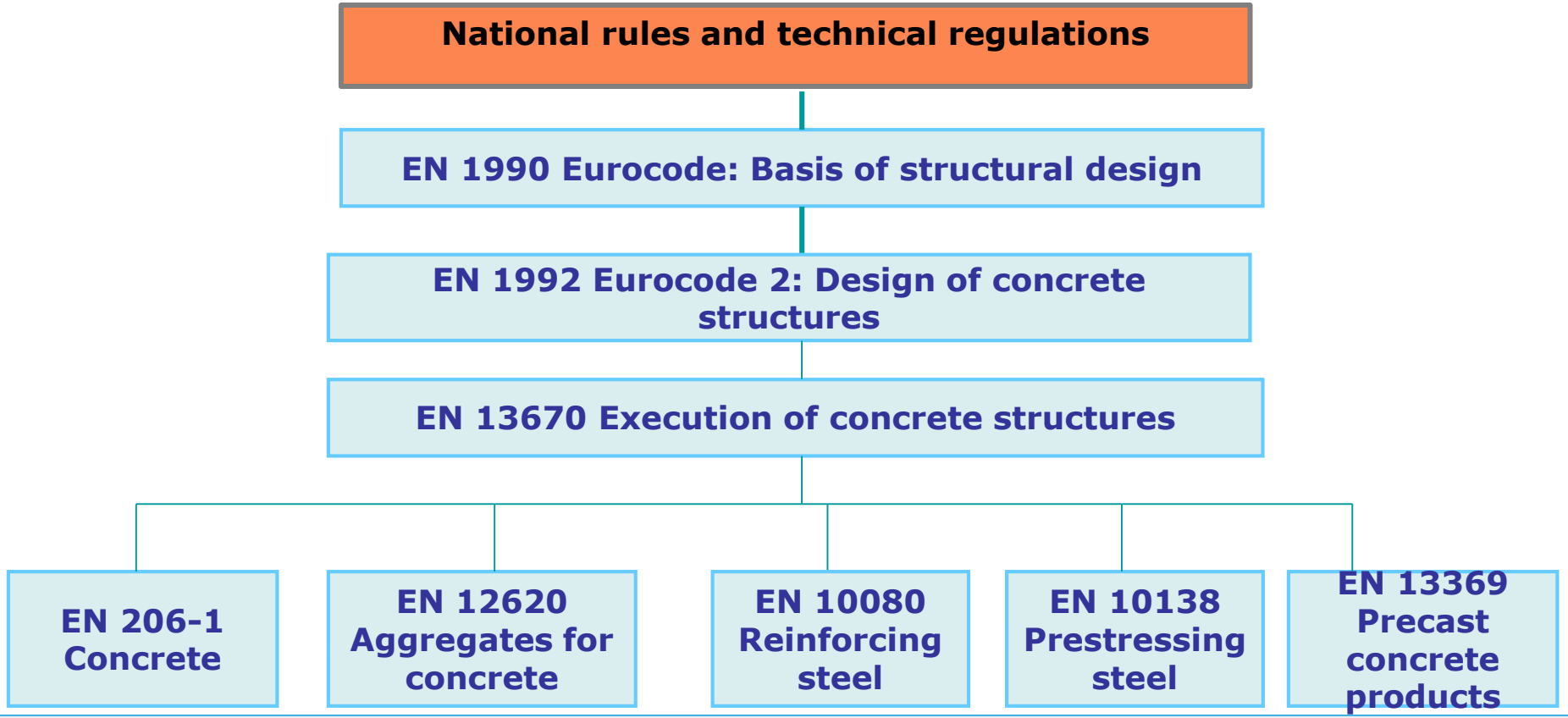
- **Despite there is no special code for assessment and retrofitting of buildings in Bulgaria, the existing practice is not completely different from the described in EN 1998-3. The surveys and collecting of information about geometry, details and materials are the same as in the Eurocode.**
- **The recommended values for return periods ascribed to the various Limit States in EN 1998-3 were accepted in Bulgaria after detailed analyses were carried out**
- **The recommended levels of inspection and testing are accepted, but a note is added for masonry buildings, for which a "case by case" approach should be taken**

NDPs for EN 1998-4 *Silos, tanks and pipelines*

- **In NA two different values for horizontal and vertical directions are proposed for the maximum value of the radiation damping**
- **For the determination of the overstrength factor on the design resistance of the piping, a numerical finite element model has been made and a recommended value has been adopted**

RELATION BETWEEN EUROCODES AND hEN/ SUPPORTING STANDARDS UNDER CPD/CPR 305

- According the last list of harmonized standards under CPR, published in OJ 09/03/2018, they are 444 now (ex. Corrigenda)
- All of them are implemented as BDS EN
- 270 (60%) of them are translated and published in Bulgarian language
- Many of the supporting standards, containing test methods, are also translated in Bulgarian language, for example for testing cement, concrete, steel materials, mortars, masonry units, insulations etc.


National rules and technical regulations
EN 1990 Eurocode: Basis of structural design
EN 1992 Eurocode 2: Design of concrete structures
EN 13670 Execution of concrete structures
EN 206-1 Concrete
EN 12620 Aggregates for concrete
EN 10080 Reinforcing steel
EN 10138 Prestressing steel
EN 13369 Precast concrete products

RELATION BETWEEN EUROCODES AND hEN/ SUPPORTING STANDARDS UNDER CPR

For main product standards for concrete production were elaborated National Annexes:

- **BDS EN 206-1:2002/NA:2008 and BDS EN 206:2013+A1:2016/ NA:2017** - Concrete
- **BDS EN 12620:2002+A1:2008/NA:2008, NA:2015, NA:2017** - Aggregate
- **BDS EN 197-1:2011/NA:2013** - Cement
- **BDS EN 13670:2009/NA:2015** - Execution
- **BDS EN 13791:2007/NA:2011** - In-situ compressive strength of concrete
- **BDS EN 450-1:2012/NA:2013** - Fly ash for concrete
- **BDS EN 934-2:2009+A1:2012/NA:2013** – Admixtures for concrete

RELATION BETWEEN EUROCODES AND hEN/ SUPPORTING STANDARDS UNDER CPR

- **BDS EN 14889-1:2006/NA:2013** - Steel fibres for concrete
- **BDS EN 14889-2:2006/NA:2013** – Polymer fibres for concrete
- **BDS EN 15167-1:2006/NA:2015** - Ground granulated blast furnace slag
- **BDS EN 934-3:2009+A1:2012/NA:2015** - Admixtures for masonry mortar
- **BDS EN 934-4:2009/NA:2015** - Admixtures for grout for prestressing tendons
- **BDS EN 934-5:2008/NA:2013** - Admixtures for sprayed concrete
- **BDS EN 998-1:2010/NA:2013** - Mortar for masonry – rendering and plastering
- **BDS EN 998-2:2010/NA:2013** – Masonry mortar
- **BDS EN 13748-1:2004/NA:2014** - Terrazzo tiles for internal use
- **BDS EN 15050:2007+A1:2012/NA:2013** - Precast concrete bridge elements

RELATION BETWEEN EUROCODES AND hEN/ SUPPORTING STANDARDS UNDER CPR

Generally in BDS are developed 170 National Annexes in construction sector, including

- **61 acting NA to Eurocodes, 7 revised, 6 drafts for revision**
- **102 acting NA to harmonized standards for construction products, 19 drafts**

EUROCODES AND NA IN BULGARIAN LEGISLATION

Ordinance N RD-02-20-19/29 December 2011 on the structural design of civil engineering structures of buildings and construction facilities by applying Eurocodes

in force from 6 January 2015 (after transitional period)

This Ordinance shell be implemented for structural design of public buildings and civil engineering works, subject of public procurement.

Exceptions:

- **For buildings of 3 to 5 category, assigned from private investors**
- **For retrofitting and reconstruction of existing buildings and civil engineering works**

They may be designed according Bulgarian norms or according Eurocodes, depending of investors assignment

EDUCATION

Education for students – in high schools for structural design

- **University of Architecture, Civil Engineering and Geodesy (UACG)**
- **High School of Building "Luben Karavelov"**
- **Varna Free University**

Education for engineers-designers – courses in Chamber of Engineers in the Investment Design (CEID)

Guides for design according Eurocodes elaborated with financial support of Chamber of Engineers in the Investment Design

Cooperation with Universities

- BDS opened Information Centers in several Universities in Sofia and in other cities
- There students have possibility to read standards on screen free of charge
- The Universities, which have signed Agreement with BDS, have obligations:
  - to participate in standardization activities with experts in those BDS/TC whose standards would like to read
  - to include in educational programs knowledge about standards and standardization
  - to keep BDS intellectual property and exploitation rights on the standards
- Currently 11 centers are functioning

Information Center at University of architecture, civil engineering and geodesy – open on 18.02.2016

Thank you for your attention!

Stay in touch

http://eurocodes.jrc.ec.europa.eu/