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Subject: Finnish comments concerning prEN 10080, EN 1992-1-1 and document PG 269**Situation**

Construction Products Regulation (CPR) should be taken into account as this standard EN 10080 will not be published before CPR is fully in force. Under CPR is required both Declaration of Performance (DoP) and CE-marking. Information provided by DoP and CE-marking should be consistent with EN 1992-1-1 and sufficient for structural design.

The draft of prEN 10080:06/2011 "Steel for reinforcement of concrete – Weldable reinforcing steel – General" does not fulfil mandate M/115 rev.1 chapter 3 item 4 and the principles of Guidance Paper L clause 3.2.4. prEN 10080 is written in a such manner that (national) product specifications are always needed. The draft is harmonising most of the test methods, FPC rules and assessment methods but it does not make declared values unambiguous and comparable (e.g. fatigue, bonding strength and bendability). Full comparison of essential characteristics of prEN 10080 to EN 1992-1-1 is presented in attached Annex 1.

For instance determination of essential characteristic "Fatigue" is defined only by description of parameters which are used in a test without definition of maximum stress or fluctuation range. EN 1992-1-1 presents as a national determined parameter fatigue design diagram. It is not possible to designer deduce from the CE-marking that the given design diagram is suitable for certain CE –marked reinforcing steel because product specifications will consist different information on fatigue testing (different amount of testing, different maximum stress and fluctuation range and it is very unlikely that the given information can be used to confirm applicability of nationally chosen design diagram).

Lack of unambiguousness and comparability leads to the unsatisfactory situation where Member States will decide which reinforcement steel classes (i.e. B 450 C in Italy) are allowed to be used on their territory. The only improvement to current situation is that the manufactures do not need national certifications for FPC for different Member States.

Because of the past slow process of preparation of EN 10080, the writers of concrete Eurocode have given also rules for reinforcing steel. Rules for reinforcing steel are given in the Annex C of EN 1992-1-1. Annex C of EN 1992-1-1 gives instruction e.g. on statistical issues and gives acceptance criteria, which belong to product standard. Annex C and prEN 10080 should be studied and made compatible. prEN 10080 should define the properties of reinforcing steel with consistent terms with Eurocodes. EN 1992-1-1 should give instructions which design rules are applicable for reinforcing steels with certain values (or classes) of properties without using (national) product specifications.

Improvement of prEN 10080 and EN 1992-1-1

- CE marking and DoP shall be based only on (pr)EN 10080. In this present format of prEN10080 is needed both prEN 10080 and product specification. Product specification is not part of the standard.
- national mandatory or de facto mandatory product specifications for reinforcing steel should not be allowed thus leading to barriers to trade
- all the references to product specifications shall be deleted in prEN 10080.
 1. Instead properties of reinforcing steel (essential characteristics) should be classified when possible, classes are easier to handle from the regulator or from the designers point of view, it gives also possibility to use coding for describing properties for reinforcing steel
 2. Harmonisation of those characteristics (e.g. bond properties in clause 7.4) and verification methods (e.g. clause 8.4.3, 8.4.4 and 8.4.6) are needed which are now referring to product specifications
- declared values should be defined unambiguously with Eurocode consistent terms and symbols in EN 10080 (national product specification should not be the document which creates link between EN 10080 and EN 1992-1-1)
- Annex C of EN 1992-1-1 and some other clauses concerning properties of reinforcement should be revised, only instructions how to use above mentioned property classes in design should given.

Opening the market for competition

Regulators in Member States should set their requirement limits or minimum values for essential characteristics which are given in Annex ZA.1 of EN 10080. These requirements/limits should be based on declared values or classes of characteristics in CE-marking. For example it is not correct if only one certain class of reinforcing steel is accepted and other reinforcing steels which have similar properties but different strength are not accepted.

Immediate actions

Further development of both standards prEN 10080 and EN 1992-1-1 is needed. ECISS/TC104 and TC250/SC2 should work more closely and joint working group should be established to solve problems presented above.

Longer term actions

Member States shall revise their regulations concerning national requirement levels for reinforcing steel to be compatible with declared values/technical classes of essential characteristics given in the CE-marking according to new EN 10080 when available.

EN 1992 shall be studied in order to cover design rules for higher strength classes of reinforcing steel than 600 MPa e.g. 700 MPa.

ECISS TC 104 shall elaborate new harmonised standards for stainless reinforcing steel, de-coiling reinforcing products, epoxy coated reinforcing steel or extend the scope of EN 10080 to cover these products.

CEN TC 250 shall study, if there is a need to elaborate new design rules for abovementioned reinforcing steel products.

With best regards,

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Comparison of prEN 10080 and EN 1992-1-1

Annex 1

Essential Characteristics of prEN 10080	prEN 10080	EN 1992-1-1	Comments
Elongation	A_{gt} in %. Characteristic can be given as upper or lower limit, which is chosen, is presented in (National) product specification. Also part of the acceptance limits should be given in (National) product specification	ε_{uk} in %, Annex C presents quantile requirements	Terms are different, EN1992-1-1 should not give requirements on statistical issues,
Weldability	Carbon equivalent in % of mass and limits for maximum values of individual elements	Weldability should be according to EN 10080.	No problems
Sections and tolerances on sizes	Nominal cross section d calculated from mass, tolerance limit values for mass	No clauses concerning this characteristics	No problems
Bendability	Bendability consists of two tests with maximum diameter of bending mandrel (bend test and re-bend test), smaller values can be declared	Minimum mandrel diameters are presented as NDP-parameters, recommended values are not in contradiction to prEN 10080 (bend test), Annex C is defining minimum mandrel diameters for re-bend test and recommended values are not consistent with prEN 10080	It is not clear which test should be used in different Member States. Use of different tests should be based only to prove different technical properties. EN 1992-1-1 does not require re-bend test for any design rule. From the CE-marking example is impossible to know which test is used. If the both tests are in the CE-mark, test should be mentioned. Usually one test method is allowed, if there are two test methods reasons should be justified e.g. additional characteristics.
Bonding strength	Bond strength is defined with surface geometry (either relative rib area or by combination of rib spacing, rib height and rib inclination of the transverse ribs), alternatively bond strength can be determined with two different test methods	Annex C gives minimum values for relative rib area to confirm when design rules of EN 1992-1-1 are valid. Values can be chosen nationally and requirements can be set in a different form e.g. for tested value is required. Requirements for statistical evaluation are given.	If CE-marking contains information of the relative rib area, designer is able to deduce suitability of the reinforcing steel for design. If other methods are used, additional information is needed to evaluate suitability ((National) project specification). Minimum requirement of Annex C can cause problems for some indented products on the market, because no design rules are available. Only one test method should be allowed.
Cyclic load strength	Test and the requirements are described in prEN 10080. Test method is in an informative Annex. Declared value is pass or fail.	No clauses concerning this characteristics	It is possible to use different test methods if they fulfil the requirements of normative text. It is not possible from CE-mark which test method is used (information is in national product specifica-

			tion)
Stress ratio (maximum strength/tensile yield strength)	R_m/R_E in %. Also $R_{e,act}/R_{e,nom}$ when relevant. Characteristic can be given as upper or lower limit, which is chosen, is presented in (National) product specification. Also part of the acceptance limits should be given in (National) product specification	EN 1992-1-1 uses different terms $k=(f_t/f_y)_k$ for stress ratio. Annex C presents quantile requirements	Terms are different. EN1992-1-1 should not give requirements on statistical issues.
Tensile strength	Tensile strength R_m in MPa. Characteristic can be given as upper or lower limit, which is chosen, is presented in (National) product specification. Also part of the acceptance limits should be given in in (National) product specification	Tensile strength f_t in Mpa	Terms are different.
Tensile yield strength	Tensile yield strength R_E in MPa. Characteristic can be given as upper or lower limit, which is chosen, is presented in (National) product specification. Also part of the acceptance limits should be given in in (National) product specification	Characteristic yield strength f_{yk} in MPa. Annex C presents quantile requirements	Terms are different. EN1992-1-1 should not give requirements on statistical issues.
Shear force	Shear force F_s in kN, minimum value is given as $0,25 A_n R_e$	Minimum value for shear strength is given $0,25 A f_{yk}$	Terms are different
Strength at elevated temperature	Characteristic is defined as a verification with stress – strain diagrams obtained from tests if the rules of EN 1992-1-2 can be used	EN 1992-1-2 gives design values for class X	Acceptance criteria between test results and Eurocodes is missing and cannot to be made without (National) product specification
Fatigue	Characteristic is presented as number of stress cycles with maximum stress σ_{max} and specified range of stress $2\sigma_a$. No values for stress or stress range are given.	Fatigue strength is given with a design diagram, which is a NDP-value. Annex C gives as NDP value maximum stress related to yield strength and range of stress with quantile requirement.	It is impossible to deduce from parameters given in prEN 10080 when certain design diagram can be used without further information from (National) product specification. Amount of tests for different stress levels to verify fatigue design diagram is not given.
Durability	Given as chemical composition.	Does not use chemical composition in design rules for durability	No problems