

Prof. Dr. Ing. Giorgio Macchi  
Emeritus Professor of Structural Engineering

Milan, 10 June 2005

Mr. Reinhard Klein  
Head of Unit Construction  
DG Enterprise  
European Commission  
Rue de la Science 15  
B-1040 - Brussels

Re.: Testo Unico delle Norme Tecniche per le Costruzioni – new Italian Code for structural design – Final draft 30 March 2005

Dear Mr Klein,

we submit to you and to the Unit Construction that you are chairing an urgent warning about the dangerous conflicting nature of the above mentioned “Testo Unico” in respect of the EUROCODES and of some harmonized Product Standards.

We are Chairman and Members of the Italian mirror Committee of CEN/TC 250 (Structural Eurocodes): The UNI-CIS Committee (Commissione di Ingegneria Strutturale) includes more than 200 Italian experts, including scientists, designers, experts of material properties and marketing, National authorities, Technical associations. .

The new draft called “Testo Unico” is intended to replace the “Norme Tecniche” which are presently in force in Italy for structural design and were issued periodically through some Ministerial Decrees, namely in the last edition:

- 1- DM 09.01.1996 n. for the design of concrete and steel structures
- 2- DM 16.01.1996 n. for actions and basis of design
- 3- DM 16.01.1996 n for structures in seismic zones

and others for masonry structures, precast structures, geotechnics and foundations, and for traffic loads on bridges

In particular, the first one (Concrete and Steel Structures) represented at its time a relevant step in the direction of Eurocodes.

In fact, for the first time the old domestic “Permissible stresses method” was excluded from the text and left still applicable only with reference to the previous Decree of 1992. It was generally recognized that such a method could not be revised because of absence of any specific research and that it was going to be withdrawn at the next occasion.

Then the ENV version of the two principal Eurocodes (EC2 and EC3) was introduced in the official national system by means of the appropriate values of the boxed quantities and reference to the correspondent UNI/CEN documents. (See Part I – Section III and Part II – Section III in “Gazzetta Ufficiale 5 febbraio 1996)

As you can verify in the new Testo Unico draft, it represents a sharp regression. First, the “Permissible stresses method” appears again in the text and with revised rules. Second, there are no specific indications referring to the application of the Eurocodes and no clauses that could be used as National technical annexes for NDPs. In addition, the requirements given for the Limit states (partial factors) method diverge sharply from the criteria assumed in Eurocodes and represent a strong obstacle to the harmonization of the design rules.

Moreover, the new Testo Unico draft is giving independent rules in the field of Product Standards ( namely for concrete and for steel ) , giving rise to potential obstacles to trade.

Even if the new draft would be amended and more than 100 “conflicting statements” and inconsistencies would be eliminated, it would be frankly unacceptable, a useless bad copy of the Eurocode system, losing the completeness and consistency of an harmonized synthesis of the European technical practice. The Testo Unico appears as an action against the implementation of the Eurocodes instead of a justified criticism for their improvement.

We remind you that Italy, through the hard work of UNI-CIS Committee and of its 9 Subcommittees, with the innovative Chairmanship of 3 Eurocode Subcommittees and active participation to many Project Teams and to CEN/TC 250 itself, has given a strong contribution to the improvement and implementation of the EN version of Eurocodes. Now we expect that a responsible audit by European authorities will save this work and prevent any undue act against European Directives.

Attached you can find a selected list of the major conflicting statements and discrepancies between Testo Unico and Eurocodes, including reference to the relevant clauses and a short explanation. The list is not exhaustive and covers only some chapters. UNI-CIS and its Subcommittees are close to conclude a critical analysis of the whole draft.

We remain at your disposal for any further explication you may need.  
Best regards.

Prof. Ing. Giorgio Macchi , University of Pavia  
Chairman of Committee UNI-CIS  
Italian Delegate to CEN/TC 250

Prof. Ing. Luca Sanpaolesi, University of Pisa  
UNI-CIS Member  
Italian Delegate to CEN/TC 250

Prof. Ing. Franco Angotti, University of Florence  
Chairman of UNI-CIS Subcommittee 2

Prof. Ing. Federico Mazzolani, University of Naples  
Chairman of CEN/TC 250 Subcommittee 9  
Chairman of UNI-CIS Subcommittee 3

Prof. Ing. Giandomenico Toniolo, Politecnico of Milan  
Chairman of UNI-CIS Subcommittee 4

## TESTO UNICO DELLE NORME TECNICHE PER LE COSTRUZIONI – EDIZ. 30.03.2005

### COMMENTS TO CHAPTERS 2, 3, 4, 5, 6, 11,12

COMMENTS DRAFTED BY WORKING GROUP OF  
C.T.E. COLLEGIO DEI TECNICI DELL'INDUSTRIALIZZAZIONE EDILIZIA  
WITH THE CONTRIBUTION OF  
A.T.E. ASSOCIAZIONE TECNOLOGI DELL'EDILIZIA  
A.C.A.I. ASSOCIAZIONE FRA I COSTRUTTORI DI ACCIAIO ITALIANI  
C.T.A. COLLEGIO DEI TECNICI DELL'ACCIAIO

- 01 – **Clause 2.6.5 p. 27** - The introduction in the ULS combination of action of the “model factor  $\gamma_E$ ” is conflicting with EN1990 (6.9b) format, because the partial factors  $\gamma_G$  and  $\gamma_Q$  already include the model uncertainty.
- 02 – **Clause 2.6.5 p. 28** – For the same reason as for comment 01, the three combination equations for SLS are conflicting with EN1990 (clause 6.5.3)
- 03 – **Clause 2.8 p. 30** –The “Permissible stresses” method , already eliminated by the 1996 Italian Code is conflicting with Eurocodes.
- 04 – **Clause 3.2.2.3 p. 37** – The reference to Classes 1 and 2 of Table 2.5.I and the consequent distinction of two different return periods makes the text conflicting with EN1998 (Eurocode 8) where this distinction is made by means of the importance factor  $\gamma_I$ .
- 05 – **Clause 3.2.2.6 p. 40- 41** – Equations 3.2.9 and 3.2.10 contain a design peak acceleration  $\alpha_{gd}$  defined in probabilistic terms which are inconsistent with Eurocode 8 format.
- 06 – **Clause 3.2.3 p. 43** – Is conflicting with Eurocode 8 format with equations 3.2.13 and 3.2.14 , while the combination factor  $\phi$  of EC8 is not present.
- 07 – **Clause 3.3.3 p. 53** – Conflicting with EN1991, instead of 50 years, return periods of 500 and 1000 years are assumed, respectively for Class 1 and 2, with an unjustified increment of wind pressure of 26 and 33 %.
- 08 – **Clause 3.5.5 p. 77** – Conflicting with EN1991, instead of 50 years, return periods of 500 and 1000 years are assumed, respectively for Class 1 and 2, with an unjustified increase of snow load with respect to bordering areas.
- 09 – **Clause 5 p. 103** – The reinsertion of the old domestic “Permissible Stresses” method, enacted by the third paragraph, is completely conflicting with the Eurocodes format, where only the Limit states (partial factors) method is codified.  
“Permissible Stresses” were removed from the Italian Code since 1996.

- 10 – **Clause 03 p. 103** – The names of concrete classes, referred only to cubic strength, don't follow the European classification given in EN206-1 (like C30/37) and therefore are conflicting with the product standard as well with Eurocode 2.
- 11 – **Clause 5.1.2.1.2 p. 105** – The “model factor  $\gamma_E$ ” is included in the partial coefficients for actions , therefore the formula for  $F_d$  is conflicting with EN1990.(see also Comment 01)
- 12 – **Clause 5.1.2.1.2 p. 106** – The symbol G to indicate prestressing, leaving P to temperature, creep and shrinkage, is inconsistent with Eurocodes, where P is used for prestressing, and in contradiction with other parts of the same Testo Unico where again P is used for prestressing.
- 13 – **Clause 5.1.2.1.2 p.106** – Table 5.1-I containing the partial factors for actions is conflicting with EN1990 and leads to a distorted application of Limit state method.(The factor for prestress is wrongly overestimated).
- 14 – **Clause 5.1.2.1.4.1 p. 107** – It is not possible to merge the conversion factor, corresponding to cylinder over cubic strength ratio, with the partial safety factor correlated to the random dispersion of concrete strength. It is conflicting with EN1992.
- 15 – **Clause 5.1.2.1.9.1 p. 115** – The overall model factor  $\gamma_{Em}=1,3$  for the strength of confined concrete core has no physical meaning, since this increased strength depends on the amount of confining reinforcement.(conflicting with EN1992).
- 16 – **Clause 5.1.2.2.2 p. 117/118** – The two equations for frequent and quasi-permanent combination are conflicting with EN1990 format.
- 17 – **Clause 5.1.2.2.2 p. 117/118** – The use of partial factor  $\gamma_E$  is conflicting with EN1990.
- 18 – **Clause 5.1.2.2.6.3 p. 120** – “Environmental conditions” are too general: they are conflicting with the exposure classes of the material standard EN206-1 which are used in EN1992..
- 19 – **Clause 5.1.2.2.6.4 p. 120/121** – The definition of sensitiveness to corrosion of steel reinforcement, upsets all EC2 cracking calculations and is conflicting with it..
- 20 – **Clause 5.1.2.2.6.5 - p.121** – The 2<sup>nd</sup> and 3<sup>rd</sup> paragraph referred to partial prestressing, are conflicting with EN1992 criteria.
- 21 – **Clause 5.1.2.2.6.6 p. 121** – The 2<sup>nd</sup> paragraph under the heading “Limit state of decompression and cracking formation”, is conflicting with EN1992 criteria for cracking verification.
- 22 – **Clause 5.1.2.2.7.1 p. 122** – The equation for the verification of maximum concrete compression, together with the related Table 5.1.XI, besides the use of meaningless factors ( $\gamma_{Ec}$  ,  $\gamma_{m,c}$ ), leads to results which are completely different from those of EN1992.

- 23 – **Clause 5.1.2.3 p. 123/125** – Having removed the requirement of a ultimate resistant moment verification, the application of “Permissible Stresses” method to prestressed beams becomes unsafe. The entire Chapter is conflicting with Eurocodes.
- 24 – **Clause 5.1.2.3 p. 123/125** – It is not understandable how the old domestic “Permissible Stresses” method, now called simply Stress method, could be updated since no research has been done on it since many years. The entire Chapter is conflicting with the Eurocodes.
- 25 – **5.1.4. p. 126** – For accidental combination of actions reference is made to point 5.1.2.1.2 where an equation with  $\psi_{0i}Q_{ki}$  is present and this is a contrast both to the 4<sup>th</sup> paragraph of Chapter 4 and to EN1990, where correctly  $\psi_{2i}Q_{ki}$  of quasi-permanent combination is used.
- 26 – **5.1.8.1.7 p. 132/133** – Without any reason, for prestressed elements the concrete stress limits in SLS are changed with respect to points 5.1.2.2.7.1 and 5.1.2.2.6.5 and anyway they are strongly conflicting with EN1992 and are penalising the prestressed concrete technique.
- 27 – **Clause 5.1.8.1.8 p. 134** The use of the symbols  $\gamma_{m,c}$  and  $\gamma_{Rd}$  is improper with respect to ECs symbology and to their physical meaning.
- 28 – **Clause 5.1.8.1.10 p.134/135** – Besides the improper use of the symbol  $\gamma_{m,s}$  which is not in this case a safety factor, following the updated EC2 criteria the second stress limitation  $\sigma_{sp} \leq f_{ptk} / \gamma_{m,s}$  with  $\gamma_{m,s} = 1,65$  has no justification.
- 29 – **Clauses 5.1.10/5.1.10.1-2-3 p. 140/142** – The classification into “declared series” and “controlled series” is completely inconsistent with the EN harmonised standards which must be complied with by precast concrete products following Directive 89/106.
- 30 – **Clause 5.7.3 p. 202** – As already said in comment 04, the distinction of Class1 and Class 2 with the consequent application rules is inconsistent with EC8 format in which the importance factor  $\gamma_I$  is used.
- 31 – **Clause 5.7.4 p. 203** – The new requirement stating that dissipative columns cannot be used for bearing vertical loads: is conflicting with EN1998 criteria.
- 32 – **Clause 5.7.4 p. 203** – There is a completely distorted definition of “secondary elements” referred to non structural elements (partitioning walls,...) that makes vain the corresponding requirement of EC8.
- 33 – **Clause 5.7.4.1 p. 203** – The requirement for an unintended eccentricity of seismic action is missing with respect to fundamental requirements of EC8.
- 34 – **Clause 5.7.4.2 p.203** – It is not possible to exclude, when the structural regularity allows it, the linear static analysis based on equivalent forces as provided by EC8 and by all other seismic codes.
- 35 – **Clause 5.7.8 p. 206** – Under item b the concrete contribution to shear resistance is quoted, referring to a “standard method” for shear design of beams which is no longer present in EN version of Eurocodes EC2 and EC8.

- 36 – **Clause 5.7.8 p. 206** – In the first paragraph plastic hinges formation is excluded in resistant structural elements: this would require to assume, in the equivalent static forces method, the behaviour factor  $q=1$  for all structures, which is a contrast to the base philosophy of EC8 and of any other seismic code.
- 37 – **Clause 6.2.3 p. 223/232** – The traffic loads and design methods for bridges are a mix of EC1 and of the present National Code which leads to paradoxical results, being inconsistent both with the new European Code and with the old domestic Code.
- 38 – **Clause 6.2.3.3.3 p. 225** – The reduction to 90 % of the intensity of load scheme 1 for local verifications has no justification, except to adjust the wrong application of the dynamic coefficient of point 6.2.3.2.
- 39 – **Clause 6.2.3.3.3 p. 225** – In EN1991 format, which is comprehensive of the dynamic effects, the crowd load shall be taken from 4,0 to 5,0 kN/m<sup>2</sup> (see also comment 41).
- 40 – **Clause 6.2.3.3.3 p. 225** – The schemes of traffic loads for bridges longer than 300 m are inconsistent with respect to EN1991.
- 41 - **Clause 6.2.3.3.3 p. 225** – Reduction of the intensity of Load Model 1 for local verification is not consistent with EN1991-2. (There is no justification for this incongruous rule).
- 42 - **Clause 6.2.3.3.3 p. 226** – Load Model 1 application, summarized in figure 6.2, where the tandem systems cannot coexist with UDLs, is not coherent with EN1991-2 where tandem systems and UDLs coexist (Fig. 4.2.a).
- 43 - **Clause 6.2.3.4 p. 225** – Traffic load values for Load Model n. 1 (table 6.2.II) are the same given in EN1991-2. Characteristic values given in EN1991-2 include dynamic magnification (4.2.2(4)), therefore this additional dynamic magnification is not justified: it would lead to extremely high values of design loads, especially for short span bridges, which are the most common ones (over 95% of the European bridges are shorter than 30 m). The choice  $\gamma_Q=1.5$  (table 6.II.IV) determines further raise up of design traffic loads (recommended value in EN1990-A2 is  $\gamma_Q=1.35$ ).
- 44 - **Clause 6.2.3.5 p. 225** – The minimum values of the breaking forces ( $0.2 \sum_i Q_{ik}$  for class 1 bridges or  $0.15 \sum_i 0.75 Q_{ik}$ ) could be much lower than the ones fixed in EC1 ( $180 \alpha_{Q1}$  kN).
- 45 - **Clause 6.2.3.6 p. 225** – Nature and values of centrifugal forces (distributed loads given in table 6.2.III) are quite different from the ones given in EC1 (concentrated loads given in table 4.3).
- 46 – **Clause 6.2.3.8 p. 230** – For seismic analysis it is not possible to leave to the designer and/or to the client the choice of the “convenient mass corresponding to variable load”: this mass is clearly specified in EC8.
- 47 – **Clause 6.2.3.12 p. 231** – The first part of Table 6.2.IV referred to “Permissible stresses” method is conflicting with the introduction of Chapter 5 where this method is reserved only to “civil buildings” out of seismic zones 1 and 2.

- 48 – **Clause 6.2.3.12 p. 231** – In Eurocodes format for traffic loads a  $\gamma_F$  value lower than for other variable actions is given ( $\gamma_F=1,35$  instead of  $\gamma_F=1,5$ ): Table 6.2.IV should be modified accordingly.
- 49 – **Clause 6.2.4.2.1 p. 232/233** – Requirements on fatigue appear too generic and lacking for load spectra: the text of EC1 should be used.
- 50 - **Clause 2.5 p. 21** – Return period for climatic actions (500 years for class 1 and 1000 years for class 2) are not consistent with the EN1990 assumptions (mean return period of 50 years – 4.1.2(7)P note 2).
- 51 - **Clause 5.2.3.1.3.2 p. 154** – Resistance evaluation format is not consistent with EN1990 (6.3.5 – formula 6.6(b) and following note).
- 52 - **Clause 5.2.3.3 p. 161-162** – Simplified method (“Permissible stresses” method) is conflicting with EN1990, where only Limit States method is foreseen.
- 53 - **Clause 12 p. 405** – Reference to Eurocodes is poor and not exhaustive. It should be clearly specified that use of Eurocodes, **supplemented by National Annexes**, is recommended.
- 54 - **Clause 11.2.2 p. 343** –
- **Clause 11.2.2.3 p. 346** – The distinction of reinforcing steel between “hot rolled steel” and “cold drawn steel” is conflicting with the **harmonized product standard** and shows the risk of obstacles to trade created when the Member States still produce product standards.
-