

Evolution of Eurocodes: General overview of changes to *treatment of concrete used in composite construction*

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Agenda – Evolution of *treatment of concrete used in composite structures*

- Key changes to *treatment of concrete*
- How ease of use has been enhanced

Key changes to *treatment of concrete in composite structures*

- *Feedback was received from the horizontal group considering bridges*
 - *They identified differences between EN1992 and EN1994 concerning a number of fundamental design concepts and rules, such as:*
 - *Shear connection*
 - *Effective concrete flange width*
- *Feedback was received from the horizontal group considering fire*
 - *This was mainly concerning elevated temperature material properties*
- *There has been on-going dialogue with SC2*

How ease of use has been enhanced

- *Where differences in the ways EN1992 and EN1994 treat concrete have been identified, SC4 has:*
- *Mirrored new EN1992 rules if possible, to avoid differences*
 - *In many cases agreed with SC2 that there are good reasons for having different rules, and tried to make this clear to users of EN1994 (see following example concerning creep and shrinkage)*
 - *Recognised there is a difference that in theory could be eradicated, but in practice cannot be (see following example concerning composite columns)*

How ease of use has been enhanced

→ Creep and shrinkage

- EN1994 currently includes some relatively simple rules concerning the treatment of creep and shrinkage
- These are conservative
- There was a suggestion that the rules from EN1992 should be used, which are more accurate and more complicated
- However, the presence of a 'large piece of steel' means this is rarely a critical design check for composite construction
 - So conservatism is not a problem
 - Complexity is not justified
- We propose to make a note to avoid reader confusion

How ease of use has been enhanced

→ Composite columns

- *The new Annex to EN1994-1-2 was based on tens of thousands of numerical simulations*
- *After these had been carried out (as part of an earlier research project), HG-Fire identified that some of the concrete material properties in EN1992 differed from those in EN1994*
 - *The latter had been used for the simulations!*

→ The PT developing the EN1994 rules confirmed that their conclusions were not sensitive to the difference in material properties, and we propose to make a note in EN1994-1-2 to avoid reader confusion.