

T 2895

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## **" Interaction equations for lateral buckling of members subjected to axial compression and biaxial bending "**

### **Summary**

The analysis of safety against buckling of members and frames may generally be carried out by using second order elastic theory. In practical applications the design by interaction formulae are still preferred as well in Germany as in other countries. Some experts had doubts whether the interaction formulae of EC 3, chapter 5.5.4, concerning axial compression and bending have sufficient safety or not.

Parametric studies were carried out using the results of ultimate load calculations. These ultimate load calculations were carried out taking into account the elastic-plastic behaviour of steel, residual stresses, geometric imperfections and spread of plasticity in longitudinal direction. Altogether 2500 results were accounted for from new calculations as well as from existing studies of other researchers. Additionally the existing test results for members subjected to axial compression and bending were taken into account.

Theoretical results and test results were compared to different design equations and evaluated statistically. The existing interaction equations were used as well as modified or new design equations. The actual discussions in ECCS TC 8 "stability" and in CEN/TC250/SC3 were taken into consideration.

The main results are : the existing equations in EC 3 have in general a sufficient safety level but may be in special cases uneconomical. A new proposal developed in cooperation with Prof. Greiner/Graz has a even better safety level and leads to more economical results. This proposal was recommended to the project team of CEN/TC250/SC3 for incorporation into the draft of EN.