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NON LINEAR DESIGN OF TAPERED ELEMENTS

ABSTRACT

The design of tapered compression members, according to the Eurocode 3 (EC3), is not covered by specific expressions allowing the direct calculation of their buckling resistance. These elements must be verified using second-order analysis or simplified methods, based on modifications of the basic procedure for uniform members.

This paper presents the development of a formulation for the design of these members, based on the introduction of additional coefficients in the EC3 expressions, which allow their application to structural elements with tapered shapes.

The evaluation of these coefficients is based on parametric studies, concerning the numerical simulation of the behaviour of several hundreds of linearly tapered members with I-shaped cross sections. The parameters taken in account on the studied cases were the members end conditions, the ratio between the weakest and strongest cross sections heights, the axis of bending and the load case (axial compression or compression with bending).