

# NEW CONSISTENT SET OF DESIGN EQUATIONS FOR EQUAL-LEG ANGLE SECTIONS AND MEMBERS

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## ABSTRACT

Angles profiles have been used since the very beginning of the steel construction due to their easy production, transportation, and ability to be connected. However, they exhibit some specific features that clearly distinguish them from other types of common sections, as they are monosymmetric sections with very small constants in both torsion and warping, their bending capacity and radius of gyration around the weak axis are substantially lower compared to the strong axis ones, their legs are susceptible to local buckling, their plastic resistances are significantly higher than their elastic ones and finally, due to the eccentric connection in one leg, they are also subjected to bending when used as single members.

The above-listed features confirm that existing common design rules for other mostly doubly symmetric types of sections cannot safely cover angle sections, what inevitably leads to the need for development of specific design provisions for angle sections. Therefore, further to a critical review of the often contradictory existing European specifications on hot-rolled equal angles, extensive experimental, analytical, and numerical studies have been conducted to propose a complete and duly validated set of design rules covering all aspects of their design. These rules include cross-section classification, cross section resistance for all types of loading as well as rules for member design to individual and combined internal normal forces and moments. All the proposed rules are written in Eurocode 3 format and should be included as Annex F in the forthcoming version of EN1993-3-1. They would be presented and discussed in the present paper.

This study was a part of the European-funded RFCS project called ANGELHY involving National Technical University of Athens (NTUA), CTICM France, Liège University and ArcelorMittal, Cosmote and SIKA companies.

**Keyword:** Angle profiles, Equal-leg angles, Design rules, Classification criteria, Stability, Numerical studies.