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Structural steelwork

Analysis of safety against buckling of plates

DIN 18 800 Part 3

Stahlbauten; Stabilitätsfälle, Plattenbeulen

This standard, together with DIN 18 800 Part 2, November 1990 edition, supersedes DIN 4114 Part 1, July 1952xx edition and DIN 4114 Part 2, February 1953x edition.

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

In this standard, the term 'load' is used for forces acting on a system from outside; this applies equally to compound terms that include the component 'load' (see DIN 1080 Part 1).

Introduction

Pending publication of a European Standard on buckling of steel plated structures, DIN 4114 Parts 1 and 2 (edition of July 1952 and February 1953, respectively) and all supplementary regulations and codes of practice will remain applicable alongside this standard.

This standard has been prepared jointly by Section 08 of the *Normenausschuß Bauwesen* (Building and Civil Engineering Standards Committee) and the *Deutscher Ausschuß für Stahlbau* (German Committee for Structural Steelwork).

The updated DIN 18 800 series of standards sets out practical rules for the engineer, based on the philosophy of design and safety formulated in *Grundlagen zur Festlegung von Sicherheitsanforderungen an bauliche Anlagen* (Principles for the specification of requirements relating to the safety of structures), issued by *Normenausschuß Bauwesen* in 1981, and also takes into account the ongoing efforts to prepare harmonized specifications at the European level (Eurocodes). The references to DIN 18 800 Parts 1 and 2 relate to the November 1990 editions.

Contents

1 General

1.1 Scope and field of application

(101) Ultimate limit state analysis

This standard specifies rules relating to the stability of steel plate members susceptible to buckling, with stresses determined by elastic theory on the basis of design actions, and is to be used in conjunction with DIN 18 800 Part 1.

It applies to stiffened and unstiffened rectangular plates subject to in-plane (axial) and shear stresses.

Plates other than rectangular in shape shall be treated accordingly.

Note 1. Analysis according to this standard is by the elastic-elastic method (cf. subclause 7.4 of DIN 18 800 Part 1).

Plastic capacity of cross sections or the structure as a whole need not be taken into consideration.

Note 2. The effect of plate buckling ('buckling', for short, unless there is risk of confusion with linear buckling) on the linear buckling of stiffened and unstiffened cross sections is dealt with in clause 5 of this standard and clause 7 of DIN 18 800 Part 2, respectively.

(102) Serviceability limit state analysis

A serviceability limit state analysis need only be carried out if specifically required in the relevant standards.

Note. Cf. subclause 7.2.3 and item 723 of DIN 18 800 Part 1.

1.2 Concepts

(103) Buckling

Buckling causes failure of a plate as a result of deflections in its perpendicular plane.

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