The Plastic Tension Field Method
This paper describes a calculation method for steel plate girders with transverse web stiffeners subjected to shear. It may be used for predicting the failure load or, as a design method, to determine the optimal amount of internal web stiffeners. The new method is called the plastic tension field method. The method is based on the theory of plasticity and is analogous to the so-called diagonal compression field method developed for reinforced concrete beams with transverse stirrups, which is adopted in the common European concrete code (Eurocode 2). Many other theories have been developed, but the method presented differs from these theories by incorporating the strength of the transverse stiffeners and by the assumption that the tensile bands may pass the transverse stiffeners, which often is observed in tests. Other methods have only dealt with a single web field between two stiffeners. The emphasis is attached to the presentation of a design method based on the diagonal tension field theory. Also, how to determine the load-carrying capacity of a given steel plate girder with transverse web stiffeners, is briefly presented. The load-carrying capacity may be predicted by applying both the lower-bound theorem and the upper-bound theorem. The upper-bound solutions have shown very good correlation with tests.

General information
State: Published
Organisations: Section for Structural Engineering, Department of Civil Engineering
Contributors: Hansen, T.
Pages: 607-618
Publication date: 2005

Host publication information
Title of host publication: Innovation & Sustainability of Structures : Proceedings of the International Symposium on Innovation & Sustainability of Structures in Civil Engineering
Volume: 1
Place of publication: Nanjing, China
Publisher: Southeast University Press
ISBN (Print): 7-5641-0188-1
Source: orbit
Source-ID: 184333
Research output: Research - peer-review : Article in proceedings – Annual report year: 2005