The Diagonal Compression Field Method using Circular Fans - DTU Orbit (23/04/2019)

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This paper presents a new design method, which is a modification of the diagonal compression field method, the modification consisting of the introduction of circular fan stress fields. The traditional method does not allow changes of the concrete compression direction throughout a given beam if equilibrium is strictly required. This is conservative, since it is not possible fully to utilize the concrete strength in regions with low shear stresses. The larger inclination (the smaller value) of the uniaxial concrete stress the more transverse shear reinforcement is needed; hence it would be optimal if the value for a given beam could be set to a low value in regions with high shear stresses and thereafter increased in regions with low shear stresses. Thus the shear reinforcement would be reduced and the concrete strength would be utilized in a better way. In the paper it is shown how circular fan stress fields may be used whenever changes in the concrete compression direction are desired. To illustrate the new design method, a specific example of a prestressed concrete beam is calculated.

General information
Publication status: Published
Organisations: Section for Structural Engineering, Department of Civil Engineering
Contributors: Hansen, T.
Pages: 36
Publication date: 2005
Peer-reviewed: Yes

Publication information
Journal: Bygningsstatistiske Meddelelser
Volume: 76
Issue number: 4
ISSN (Print): 0106-3715
Original language: English
Source: orbit
Source-ID: 184337
Research output: Contribution to journal › Journal article – Annual report year: 2005 › Research › peer-review