ENGLISH SUMMARY

CALCULATION OF THE FIRE RESISTANCE OF RECTANGULAR HOLLOW SECTION AND I (H) - PROFILES MADE OF STEEL

Reino Niemimaa

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The article describes a possible correction to the equations presently used for fire resistance calculations of protected and unprotected steel profiles. The heat transport at the surface is divided into its radiative and convective components, and their ratio of the total heat transport into the profile, and the effect the fire temperature has on this ratio is shown through example calculations. The different fire curves given in the ENV:s suggested by CEN/TC 127 are used. Equations, which take into consideration the ratio of the profiles radiative and convective surface, ie. the "own shadow effect" of the profile, are developed. The corrections that these equations give to the calculated fire resistance of protected and unprotected steel columns and beams are significant especially when the effect of the "own shadowing" is big, as for I-profiles, and the insulation is thin, eg sprayed mineral fibre or intumescent paint.

OPTIMIZATION OF THIN AXISYMMETRIC SHELL STRUCTURES

Esa Murtola

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In this paper the exact finite element method is used in the optimization of thin elastic shells of revolution. Because of the exact approach the number of the elements in a model is small and analytical derivatives can be used easily in the design sensitivity analysis. In addition, the results are exact within the framework of the theory. The object function of the optimization problem is the material volume of the structure, when the design variables are the thicnesses and the nodal coordinates of the elements. The constraints are imposed for displacements and stresses of the structure and the enclosed volume of the structure. Results are illustrated by a couple of examples.

ENGLISH SUMMARY

HEAT AND MOISTURE DISTRIBUTION AT THE CONNECTION OF FLOOR AND EXTERNAL WALL IN MULTISTOREY TIMBER HOUSES

Markku Sahlström
Mikko Kilpeläinen

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The article deals with the heat and moisture distribution at the connection of floor and external wall in multistorey timber houses. Becouse the moisture barrier of the external wall doesn't exist at the connection, the relative humidity at the joint of these structural elements can exceed the critical limit 80 %. The risk of decay in timber at the connection is analysed theoretically. The analysis is based on the finite element method on the stationary heat and moisture flux and on the monthly average moisture and relative humidity.