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BSI Standards Publication

Fire safety engineering — Assessment, verification and validation of calculation methods

Part 4: Example of a structural model

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National foreword

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Part 4: Example of a structural model

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Partie 4: Exemple d'un modèle structural

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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The committee responsible for this document is ISO/TC 92, *Fire safety*, Subcommittee SC 4, *Fire safety engineering*.

ISO 16730 consists of the following parts, under the general title *Fire safety engineering — Assessment, verification and validation of calculation methods*:

— *Part 2: Example of a fire zone model* [Technical Report]

— *Part 3: Example of a CFD model* [Technical Report]

— *Part 4: Example of a structural model* [Technical Report]

— *Part 5: Example of an Egress model* [Technical Report]

The following parts are under preparation:

— *Part 1: General* (revision of ISO 16730:2008)

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Introduction

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For the particular case of the example application of ISO 16730-1 described in this document, ISO takes no responsibility for the correctness of the code used or the validity of the verification or the validation statements for this example. By publishing the example, ISO does not endorse the use of the software or the model assumptions described therein and states that there are other calculation methods available.

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Fire safety engineering — Assessment, verification and validation of calculation methods —

Part 4: Example of a structural model

1 Scope

This part of ISO 16730 shows how ISO 16730-1 is applied to a calculation method for a specific example. It demonstrates how technical and users' aspects of the method are properly described in order to enable the assessment of the method in view of verification and validation.

The example in this part of ISO 16730 describes the application of procedures given in ISO 16730-1 for a structural fire resistance model.

The main objective of the specific model treated here is the simulation of the heat transfer and structural responses of wall assemblies.

2 General information on the structural model

An analytical model for predicting the fire resistance of load bearing, gypsum protected, wood-stud wall assemblies is presented. The model couples a heat transfer sub-model and a structural sub-model. The heat transfer sub-model predicts the temperature profile inside the wood-stud wall and the time to insulation failure. The structural sub-model, based on the elastic buckling-load, uses the temperature profile to calculate the deflection of the wood studs and the time to structural failure of the assembly.

3 Methodology used in this Technical Report

For the calculation method considered, checks based on ISO 16730-1 and as outlined in this Technical Report are applied. This Technical Report lists in Annexes A and B the important issues to be checked in the left-hand column of a two-column table. The issues addressed are then described in detail, and it is shown how these were dealt with during the development of the calculation method in the right-hand column of the Annexes A and B cited above, where Annex A covers the description of the calculation method and Annex B covers the complete description of the assessment (verification and validation) of the particular calculation method. The Bibliography includes a worked example and user manual.

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