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BSI Standards Publication

Fire safety engineering — Performance of structures in fire

Part 4: Example of a fifteen-storey steel-framed office building

bsi.

National foreword

This Published Document is the UK implementation of ISO/TR 24679-4:2017.

The UK participation in its preparation was entrusted to Technical Committee FSH/24, Fire safety engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Part 4: Example of a fifteen-storey steel-framed office building

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Partie 4: Exemple d'un immeuble de bureaux en structure acier de quinze étages

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 4, *Fire safety engineering.*

Introduction

This document is an example of the application of ISO 24679-1, prepared in the format of ISO 24679-1. It includes only those subclauses of ISO 24679-1 that describe the steps of the methodology for assessing the performance of structures in fire. It preserves the numbering of subclauses in ISO 24679-1 and so omits numbered subclauses for which there is no text or information relevant to this example.

This example is intended to illustrate the implementation of the steps of the fire resistance assessment, as defined in ISO 24679-1. Only steps that are considered to be relevant to this example are well-detailed in this document. The technical contents are based on the performance based verification methods for fire resistance in the Building Standards Law of Japan, but were slightly modified for simplicity and compatibility with ISO 24679-1.

TECHNICAL REPORT **ISO/TR 24679-4:2017(E)**

Fire safety engineering — Performance of structures in fire —

Part 4: Example of a fifteen-storey steel-framed office building

1 Scope

This document provides a fire engineering application relative to the fire resistance assessment of a fifteen-storey steel framed building following the methodology given in ISO 24679-1. This document describes the adopted process which follows the same step by step procedure as that provided in ISO 24679-1. The annexes of this document present the detailed assessment results obtained for the most severe fire scenarios on the basis of the outcome of this specific fire safety engineering procedure for the building.

The fire safety engineering applied in this example to the office building with respect to its fire resistance considers specific design fire scenarios as well as the corresponding fire development. It takes into account fully-developed compartment fires. In realistic situations, activation of fire suppression systems and/or intervention of fire brigade are expected, but their beneficial effects are not taken into account. It should be noted that these severe fire scenarios have been selected for fire resistance purposes.

Global structural behaviour is not explicitly considered, but implicitly included in the calculation formulae. Since the building of the example is located in a seismic region, principal structural elements are rigidly connected to each other. Load redistribution from heated elements to cold surrounding elements exists, but it's not taken into account in the design calculations. By this approach, design is conservative, while the process of safety checking is greatly simplified and clear. As a result, all the calculations were carried out by explicit algebraic formulae.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13943, *Fire safety — Vocabulary*

ISO 23932, *Fire safety engineering — General principles*