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Fire safety engineering — Design of ~~Evacuation~~ ~~Experiment~~evacuation experiments

Ingénierie de la sécurité incendie — Conception des ~~exercices~~expériences d'évacuation

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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.

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).

~~Attention is drawn~~ ISO draws attention to the possibility that ~~some of the elements~~ implementation of this document may ~~be involve~~ the ~~subject~~ use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights. ~~Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).~~

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For an explanation of 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~~, see www.iso.org/iso/foreword.html.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

*This document is dedicated to
the memory of Gyslène PROULX
for her research on human behaviour in fire*

Introduction

Performance-based engineering requires analyses of building design ~~that~~. Such analyses require a great deal of data ~~about~~ occupant response, movement and behaviour. Data is also collected for the development and validation of model calculations. Empirical data sets are rare and those that exist can be difficult to use in combination.

This document provides guidance in the conduct of evacuation experiments and the collection and coding of data, so that users ~~can~~ understand the context under which the data was collected, and ~~in order to facilitate the use of~~ data sets ~~could more likely be used~~ in combination with each other. Although the development of a repository of data is not part of the scope of this document, the use of a consistent process ~~of~~ collecting and distilling peer-reviewed reaction, response and movement data will allow the development of such a repository.

This document specifies the techniques used in the collection of evacuation data. ~~It also provides~~ guidance ~~in~~for documenting ~~the experiment~~experiments, so as to provide context and background for the use of the data, ~~and~~as well as a methodology for the coding of ~~that~~those data.

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~~Fire safety engineering~~ — Design of Evacuation Experiments

~~1~~ Scope

This Technical Specification specifies a methodology for the design of experiments conducted in the built environment to collect data on evacuation:

- ~~For use in fire safety engineering~~
- ~~To compare different evacuation experiments realised in different jurisdictions and conditions~~
- ~~To study one or more variables~~
- ~~To have on general overview of an evacuation or to test one or more parameters~~
- ~~To design safety procedures and training~~
- ~~To contribute to assessing evacuation plan(s)~~
- ~~To contribute to reduce uncertainty on the results~~
- ~~To verify the relevance of preventive measures put in place before and after building design~~
- ~~To refine software input parameters and make them more realistic~~
- ~~To compare the results obtained with different software~~
- ~~To contribute to verifying and validating evacuation models (for example ISO 16730-1)~~

~~This document provides guidance in several main areas: initial planning, preparation, the evacuation experiment itself, coding the collected data, data analysis and interpretation and documentation of results.~~

~~This document sets out the considerations for an evacuation experiment, including geometry of the space, lighting and environmental conditions, occupant characteristics, cue or alarm used, instrumentation and safety considerations. It discusses performance measurements for the evacuation experiment. The results of any experiment depend on all these factors and their interactions, if any. It does not define a standard evacuation experiment.~~

The main criterion suggested in this document for evaluating an evacuation is total evacuation time ~~—~~(a parameter of Escape "escape time" as defined in ISO/TR 16738.). Evacuation time includes pre-travel activity time (often called "pre-movement time") and travel time. Escape time depends ~~upon~~ on a range of qualitative and quantitative parameters (see ISO/TR 16738). Other possible performance measurands ~~are~~ include walking speeds on horizontal surfaces, stairs and ramps, occupant densities, flows through openings, delays before and during evacuation, exit choice, affiliation, altruism, scepticism, courtesy range, herding behaviour, space occupancy, risk perception, etc. Information on the influence of these parameters on total evacuation time and on understanding human behaviours ~~are~~ is available in ISO/TR 16738, ISO/TS 29761, and SFPE Guide [1], [2].

Instrumentation for measuring walking speeds, densities, delays, etc., is discussed in this document, along with suggested locations for instrumentation. A minimum level of instrumentation is also suggested.

The safety of participants is strongly emphasized in this document.

The evacuation experiments carried out in accordance with this ~~Technical Specification document~~ will allow the comparison of the results of other experiments ~~also~~ realized ~~also~~ with this ~~Technical Specification document~~ and thus, ~~will~~ contribute to increased epistemological knowledge. This ~~would aid~~ ~~it will be useful for~~ the development or modification of building regulatory requirements and could provide useful information for assisting in the development or testing of evacuation models.

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