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Digital management of fire safety information

Part 1: Design, construction, handover, asset management and emergency response – Code of practice

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Contents

Summary of pages
This document comprises a front cover, an inside front cover, pages I to VI, pages 1 to 72, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 July 2022. It was prepared by Subcommittee FSB/1/1, *Digital management of fire safety information*, under the authority of Technical Committee FSB/1, *Fire safety and built environment task group*. A list of organizations represented on these committees can be obtained on request to the committee manager.

Relationship with other publications

BS 8644 is expected to be published in the following parts:

- Part 1: *Design, construction, handover, asset management and emergency response – Code of practice*;
- Part 2: *Development and use of fire strategies – Code of practice*[1)].

Information about this document

The defining concept leading to the development of this part of BS 8644 originates from the lack of availability of accessible and relevant fire safety information for assets across the built environment. This part of BS 8644 has been developed under the principles of the following three strategic objectives:

a) provide a safer built environment that is appropriate for the intended end users;

b) reduce disruption to business operations and property loss from fire; and

c) enable relevant, accurate and accessible fire safety information to be made available to the right people at the right time.

The use of digital applications to facilitate the management of fire safety information provides several advantages that are further explored throughout this part of BS 8644.

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Users may substitute any of the recommendations in this British Standard with practices of equivalent or better outcome. Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

1) To be developed in due course.

will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

The word "should" is used to express recommendations of this standard. The word "may" is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word "can" is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

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Attention is drawn to regulatory requirements in respect of the following principal stages in the lifetime of an asset:

- planning – type, size, use, appearance, access and location of a proposed asset;
- works on existing assets, including change of use, material alterations and extensions of existing assets – selection of materials, products, nature and extent of active and passive fire safety features within and external to the asset, and proximity to other assets; changes in fire risk and/or fire safety provisions;
- construction works – correct installation of all fire safety features, and fire safety arrangements to deal with a fire incident during construction;
- use – occupants and their activities, including storage and use of materials, provision of first strike fire-fighting equipment and fire safety training of persons with fire safety duties, and maintaining means of escape and other fire safety systems and equipment;
- end of life – fire safety arrangements during demolition work; and
- vacant or derelict assets – fire safety arrangements and risk presented to persons and assets in the vicinity.

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0 Introduction

0.1 General

The management of fire safety information during an asset's life cycle has traditionally been conducted in isolation, with dutyholders responsible for the relevant stage of the development working independently of each other when considering fire safety risk and legislative duties. Asset owners have rarely defined and structured the fire safety information for their assets, or planned the digitization, update and handover of that information at key identifiable stages.

Equally, practices to facilitate the handover of fire safety information to enable the safe and effective management of an asset have been proven to be generally substandard, with a varying degree of standardization across the built environment. Furthermore, such information has traditionally been analogue, largely paper-based, and managed using manual processes, making it difficult for the information to be accessed and updated.

This has led to the management of fire safety information being applied inconsistently, with valuable information being overlooked, miscommunicated or forgotten, in turn preventing the effective, dynamic and active management of fire safety information across the built environment. A digital process to manage fire safety information is an essential part of overcoming these challenges.

The development and management of fire safety information using defined digital processes will, for large parts of the built environment, represent a transformative shift in practice, although some participants already use digital processes to manage this information.

A phased approach to digital management of fire safety information is required, which in turn will enable a pragmatic cultural shift, assisted by interpretable guidance that participants can apply to their practices. There are many practices for digital management of fire safety information, and this part of BS 8644 does not recommend one over the other. Digital platforms, the software used, and the technology deployed to manage fire safety information are at the discretion of the user of this standard.

An information exchange for fire safety information, FIREie, is proposed for the purpose of exchanging predetermined and evolving fire safety information. Further information on FIREie is given in **0.4**.

0.2 Relationship to the golden thread

Following the Grenfell Tower tragedy in June 2017, where 72 lives were lost, Dame Judith Hackitt published the *Independent review of building regulations and fire safety: Final report* [1]. Dame Judith concluded that there was "unanimous concern surrounding the ineffective operation of the current rules around the creation, maintenance and handover of building and fire safety information". She made four recommendations in relation to developing a "golden thread of building information" for higher risk buildings.

Central to these recommendations was the need to create a "digital standard of record-keeping for the design, construction and during the occupation of new High-Risk Residential Buildings (HRRBs)".

NOTE High-risk residential buildings are now referred to as higher-risk buildings.

The principles of the golden thread, within the context of legislation applicable to higher risk buildings, are set out in the Building Regulations Advisory Committee (BRAC) golden thread working group report, which can be found at https://www.gov.uk/government/publications/building-regulations-advisory-committee-golden-thread-report/building-regulations-advisory-committee-golden-thread-report.

buildings, successfully developing a golden thread of fire safety information for all asset types can help deliver proportionate standards of fire safety for all assets. This will enable information on a new or existing asset to remain relevant, accurate, and accessible to all necessary persons throughout the asset's life cycle.

This part of BS 8644 outlines an information management process that enables information to be digitally managed and exchanged. It is designed to be appropriate to all assets across the built environment, including buildings for which a golden thread of information is required.

0.3 Holistic fire safety information management

The information management process in this part of BS 8644 does not relate solely to the presentation and storage of fire safety information; it also involves the necessary confirmation of information requirements relevant to fire safety that identify how that information is to be exchanged and managed, and by whom. It requires the active participation of persons with responsibility to manage fire safety information. In the case of a new development, the appropriate level of fire safety information can be developed, updated and exchanged, and in the case of existing assets, fire safety information requirements can be suitably and sufficiently identified and confirmed.

The creation of defined processes, facilitated within an overarching framework, for managing the flow of fire safety information digitally during an asset's life cycle, will enable the information to be relevant, accurate and accessible to the right people at the right time. Predetermined processes and planning enable assets to be appropriately designed, constructed as intended, and effectively managed and maintained, such that all users of the built environment are as safe as possible from the effects of fire.

Integrating the use of a framework with the digital management of fire safety information also enables relevant participants involved within the life of the asset to contribute to the digital record of fire safety information. This in turn promotes higher standards of occupant and building safety.

Information requirements need to be clearly communicated to all stakeholders as follows.

a) Where the BS EN ISO 19650 series of standards is adopted, information requirements are expressed at an organizational, asset and/or project level, with detailed information requirements determined for each party appointed by the appointing party. Information generation and delivery is then planned by each lead appointed party.

b) Where the BS EN ISO 19650 series of standards is not adopted, information requirements might be expressed in an employer's requirements document or similar specification.

Further information on the relationship of this part of BS 8644 to the BS EN ISO 19650 series is given in **0.5**.

0.4 Information exchange for fire safety information (FIREie)

FIREie is a repository for fire safety information relating to an asset. It is the mechanism by which fire safety information is exchanged between parties, and is central to the digital management of such information.

FIREie resembles but is not the same as the COBie information schema as documented in the UK BIM Framework (see **0.5**).

BS EN ISO 19650 sets out principles and specifies requirements for information management during an asset's life cycle, including project delivery.

This part of BS 8644 builds on the BS EN ISO 19650 series where this is appropriate.

Where building information modelling (BIM) processes are used in project delivery or asset operation, it is anticipated that BS EN ISO 19650-2 or BS EN ISO 19650-3 will be used to specify and deliver fire safety information, in addition to the recommendations made in this part of BS 8644.

However, this part of BS 8644 has also been written to be applicable where BIM processes are not used during project delivery or asset operation. In these cases, the principles outlined in BS EN ISO 19650-1 can still be applied in relation to fire safety information, e.g. clear definition of information requirements and review of information deliverables against those requirements.

The UK BIM Framework (www.ukbimframework.org) also contains some British Standards, in addition to the BS EN ISO 19650 series, which are referred to in this part of BS 8644 at relevant points. Users of this part of BS 8644 might also find it helpful to refer to the guidance published as part of the UK BIM Framework.

0.6 Fire safety information and inclusive design

People of all ages, with a range of abilities, disabilities, impairments and health conditions, all use the built environment. Assets therefore need to be designed, constructed and managed to anticipate and readily accommodate a wide range of end user requirements.

Over 20% of the population[2)] are disabled, with mobility impairments being amongst the most common. In addition, many people have age-related or acquired impairments. These numbers are expected to increase significantly due to the UK's ageing society.

Fire safety is dependent upon the extent to which the requirements of end users have been integrated into the brief and the design, and delivered throughout construction, management and maintenance of an asset. It is therefore necessary for fire safety information for all end users to be identified and integrated at the briefing stage, and addressed at each subsequent stage throughout the asset's life cycle.

An inclusive design approach needs to be followed so that the asset is suitable for as many people as possible.

The recommendations contained in this part of BS 8644 enable an information management framework to be developed, such that the relevant information required to achieve an inclusive design approach can be identified, recorded and made available at information exchange points (IEPs).

0.7 The purpose of information as it relates to fire safety

The application of this part of BS 8644 is intended to enable:

- getting the right information to the right people at the right time;
- clear identification of fire safety hazards, people, assets and environments at risk, and measures put in place to mitigate those risks;
- clear identification of tasks and trigger events throughout an asset's life cycle;

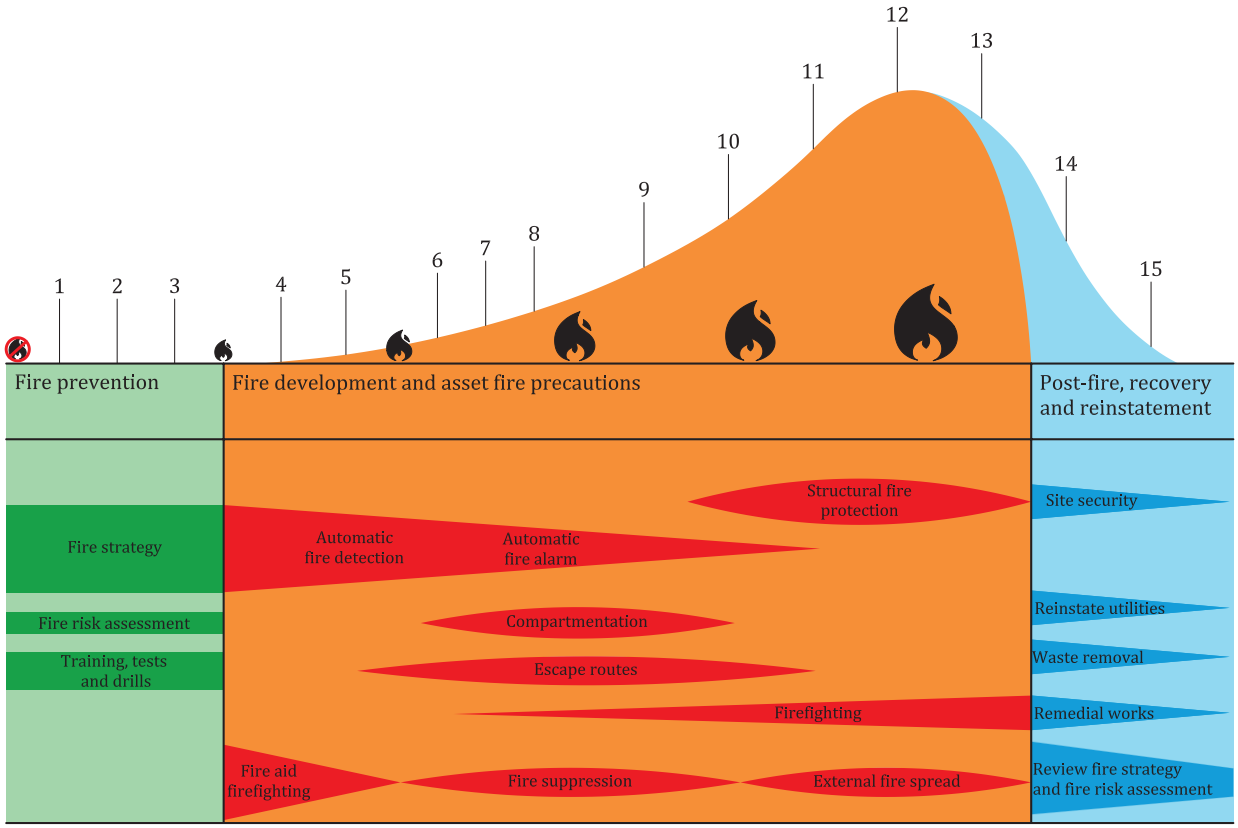
  NOTE One important trigger event where information needs to be exchanged is a fire incident where fire safety information is required by emergency services.

2) Source: https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020/family-resources-survey-financial-year-2019-to-2020.

- clear understanding of technical information by all parties sharing responsibilities for fire safety; and
- appropriate dissemination of fire safety knowledge, experience and lessons learnt.

Figure 1 gives an example for an asset with multiple fire safety precautions. It explains what fire safety information is needed for the asset in day-to-day use, and over the course of a fire incident, from initial fire growth, through to a severe, potentially uncontrolled fire, to post-fire investigation and remediation. It also indicates fire protection measures relevant at different stages of a fire.

Figure 1 — *Example of relevant information before, during and after a fire incident*



Key

1	Control of fire hazards	9	Fire and smoke spread
2	Maintenance	10	Asset, content and property damage
3	Fire safety management	11	Surrounding impacts
4	Locations	12	Structural performance
5	Causes	13	Recovery
6	Fuel type	14	Investigation
7	Ventilation	15	Fire risk profile change
8	Human factors		

explains:

a) how the asset needs to be operated to prevent fires from occurring;

b) what active and passive fire safety measures are provided for the asset, including specific measures for disabled people;

c) how these measures need to be maintained and how they interact with each other; and

d) what training, tests and fire drills are needed, to be prepared in case of a fire incident.

Fire safety information in the event of a fire is needed, for example:

1) during the early stages of a fire:

   i) to identify the location and cause of the incident through fire detection measures;

   ii) to provide early warning through the fire detection and fire alarm system to allow trained persons to investigate the cause and location of the fire and enable intervention where appropriate; and

   iii) to provide early warning to enable people to escape, in particular people who might require more time and assistance to escape;

2) during the developed stages of a fire:

   i) to inform firefighting response tactics, taking into consideration such factors as the fuel available to the fire, ventilation conditions, environmental factors, and human factors of people who might require rescue;

   ii) to explain built-in safety measures in place to control a significant fire in the asset and protect the surrounding environment from external fire spread; and

   iii) to identify parts of the asset that are specifically protected from fire and smoke damage, or that might need salvage in the event that protective measures fail;

3) after a fire:

   i) to implement planned recovery strategies, and post-fire investigations;

   ii) to enable site recovery, waste removal, reinstatement of utility services and planning of remedial works; and

   iii) to capture changes to the fire strategy, risk profile and risk assessments.

1 Scope

This part of BS 8644 gives recommendations for the management, presentation and exchange of fire safety information using digital information management processes.

It covers all stages in the life cycle of assets in all parts of the built environment (including infrastructure). It describes information exchange points (IEPs) for:

a) briefing stage;

b) design stage;

c) construction stage;

d) asset handover stage;

e) asset in use stage;

f) asset end of life stage; and

g) fire and rescue service intervention.

It is intended to be used by individuals and organizations that contribute to fire safety information during an asset's life cycle. It is applicable to both new and existing assets.

This part of BS 8644 introduces a process known as "information exchange for fire safety information" (FIREie). It does not recommend any specific schema for this process.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document[3]. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN ISO 19650 (all parts), *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling*[4]

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this part of BS 8644, the terms and definitions given in the BS EN ISO 19650 series and the following apply.

3.1.1 appointed party

provider of information concerning works, goods or services

NOTE Where the term "appointed party" is used throughout this part of BS 8644, it covers designers and contractors (during construction, operation and end of life).

[SOURCE: BS EN ISO 19650-1:2018, **3.2.3**, modified – Notes to entry replaced]

[3] Documents that are referred to solely in an informative manner are listed in the Bibliography.

[4] This standard also gives dated references to BS EN ISO 19650-1:2018, BS EN ISO 19650-2:2018 (incorporating corrigendum February 2021) and BS EN ISO 19650-3:2020.

