PD ISO/TR 5202:2023

BSI Standards Publication

Buildings and civil engineering works — Building resilience strategies related to public health emergencies — Compilation of relevant information

Documents
Document Sharing Hub

Full document details: PD ISO/TR 5202:2023

National foreword

This Published Document is the UK implementation of ISO/TR 5202:2023.

The UK participation in its preparation was entrusted to Technical Committee CB/-/8, ISO/TC 59 Input Coordination.

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

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

© The British Standards Institution 2023
Published by BSI Standards Limited 2023

ISBN 978 0 539 13722 4

ICS 13.020.20; 91.040.01; 93.010

Compliance with a Published Document cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 June 2023.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: PD ISO/TR 5202:2023

TECHNICAL REPORT

ISO/TR 5202

First edition
2023-06

Buildings and civil engineering works — Building resilience strategies related to public health emergencies — Compilation of relevant information

Reference number
ISO/TR 5202:2023(E)

Documents
Document Sharing Hub

© ISO 2023

Full document details: PD ISO/TR 5202:2023

COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2023 – All rights reserved

Documents
Document Sharing Hub

Full document details: PD ISO/TR 5202:2023

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Concept **1**
4.1 Resilience 1
4.2 Public health emergencies 1
5 Derivative scenarios **2**
6 Challenges **4**
6.1 General 4
6.2 Maintain indoor safety — Infection risks 5
6.3 Quarantine 5
6.3.1 Infection risks 5
6.3.2 Decline in activity and mood 6
6.4 Maintain hospital operation 6
6.4.1 Infection risks 6
6.4.2 Medical overload 6
6.5 Alternate care site 6
6.5.1 Infection risks 6
6.5.2 Mismatch in function 7
6.6 Work/study from home 7
6.6.1 Infection risks 7
6.6.2 Low efficiency 7
6.6.3 Non-ergonomic 7
6.7 Reopen — mold/*Legionella* 7
7 Resilience strategies **8**
7.1 General 8
7.2 Maintain indoor safety 10
7.2.1 Layout 10
7.2.2 Envelope 10
7.2.3 Interior finish 10
7.2.4 HVAC 10
7.2.5 Plumbing and waste 11
7.2.6 Other relevant literatures 11
7.3 Quarantine 11
7.3.1 Layout 11
7.3.2 Interior finish 12
7.3.3 HVAC 12
7.3.4 Plumbing and waste 12
7.3.5 Other relevant literature 13
7.4 Maintain hospital operation 13
7.4.1 Layout 13
7.4.2 HVAC 13
7.4.3 Plumbing and waste 13
7.4.4 Electric and smart 14
7.4.5 Advanced technology 14
7.4.6 Other relevant literatures 14
7.5 Alternate care site 14
7.5.1 Layout 14
7.5.2 Structure 15
7.5.3 Interior finish 15

© ISO 2023 – All rights reserved

AVA Documents
Document Sharing Hub
Full document details: PD ISO/TR 5202:2023

7.5.4 HVAC ... 15
7.5.5 Plumbing and waste ... 16
7.5.6 Electric and smart ... 16
7.5.7 Other relevant literatures ... 16
7.6 Work/study from home ... 16
7.6.1 Layout ... 16
7.6.2 Interior finish ... 17
7.6.3 Electric and smart ... 17
7.7 Reopen ... 18
7.7.1 Layout ... 18
7.7.2 HVAC ... 18
7.7.3 Plumbing and waste ... 19
Bibliography ... 20

© ISO 2023 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 5202:2023

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the 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.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*.

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.

© ISO 2023 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 5202:2023

Introduction

Looking back at the history of building design, improvements have sometimes been driven by epidemics, such as the 19th century cholera outbreak in London, which led to a greater emphasis on ventilation and the use of dense, easy-to-clean materials such as tiles rather than carpets[1]. After the 1918 flu pandemic, guest bathrooms were added to residences to reduce exposure and infection risk[2].

Improvements are still required in public health emergencies of the 21st century where buildings based on current design standards show inadequate adaptability. In COVID-19, for example, large numbers of densely populated public buildings such as schools, offices, malls were forced to close due to high risk of infection. Even in homes the risk of infection still existed. Medical facilities could not bear the sudden increase in infectious patients, and some sports stadiums, exhibition halls, etc., were transformed into temporary hospitals. In face of these challenges, a number of improvements have already appeared in some cases, as well as in some guidelines, standards and studies by relevant international, national, and regional organizations and institutions.

This document collects the challenges posed by the epidemic to built environment and the corresponding adaptation solutions during 21st century public health emergencies, particularly COVID-19, to provide a reference for resilience design of built environment to adapt to future changing environment.

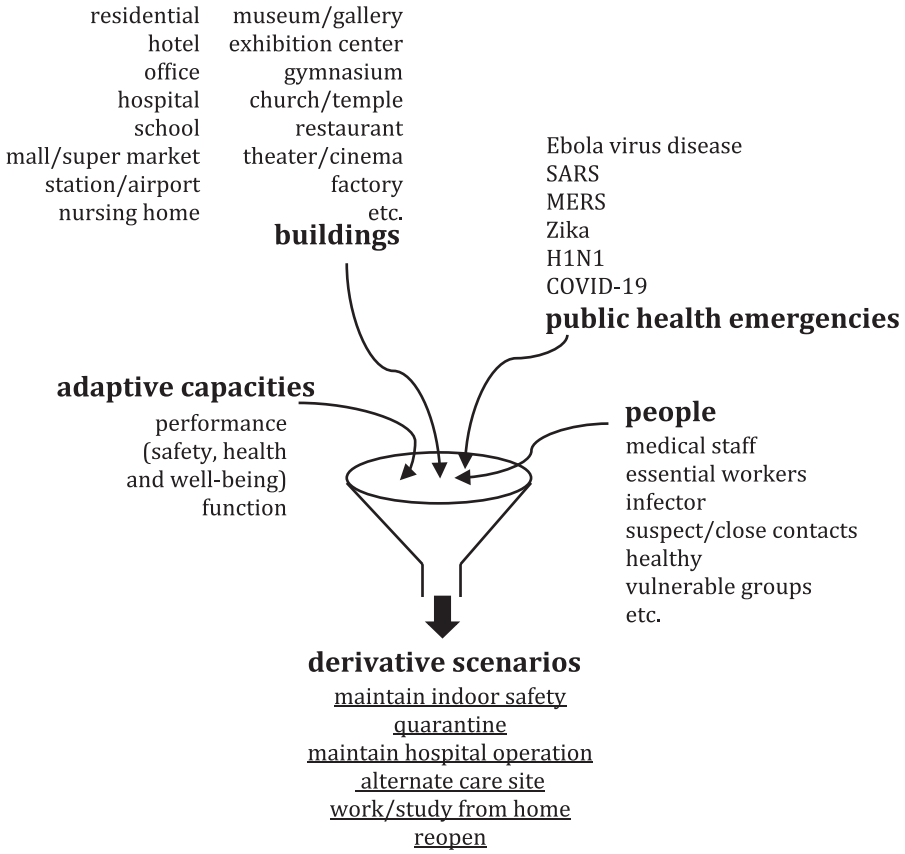

Figure 1 — Generation of derivative scenarios

For better comprehension, this document categorizes the challenges and solutions in terms of six typical derivative built environment scenarios during the pandemic, including maintaining indoor safety, quarantine, maintaining hospital operation, alternate care site, working/studying from home, and reopening. These six scenarios are informed by an information search based on combinations of such key words as different population groups, building types, public health emergencies and adaptive capacities (see Figure 1).

© ISO 2023 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 5202:2023

The document is helpful to stakeholders including end-users, investors, authorities, standards developing organisations, specialists (engineers, architects, etc.), manufacturers and builders, as well as other parties involved in public health emergencies, such as public health administrators, medical staff.

© ISO 2023 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 5202:2023

Documents
Document Sharing Hub

Buildings and civil engineering works — Building resilience strategies related to public health emergencies — Compilation of relevant information

1 Scope

This document provides a compilation of relevant information on building resilience strategies in response to public health emergencies, including:

— challenges of public health emergencies on built environment;

— resilience strategies to meet the challenges;

excluding:

— emergency operations;

— personnel organization and management.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
resilience
adaptive capacity of an organization in a complex and changing environment

[SOURCE: ISO Guide 73:2009, 3.8.1.7]

4 Concept

4.1 Resilience

Buildings with a service life of decades or even hundreds of years can encounter challenges that were not anticipated when they were designed. Resilience of built assets can reduce losses in the future complex and changing environment.

4.2 Public health emergencies

Expressions of public health emergency vary in different contexts. They are generally described as the events that seriously affect public health. Table 1 lists some typical expressions.

© ISO 2023 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 5202:2023

Table 1 — Expressions of public health emergency

Expressions	Description	Source
Public health risk	A likelihood of an event that can affect adversely the health of human populations, with an emphasis on one which can spread internationally or can present a serious and direct danger	International health regulations (2005) [4] WHO
Public health emergency of international concern	An extraordinary event which is determined, as provided in these regulations: — to constitute a public health risk to other states through the international spread of disease and — to potentially require a coordinated international response	
Public health emergency	Outbreaks of major infectious diseases, group diseases of unknown origin, major food and occupational poisoning and other events seriously affecting public health that occur suddenly and cause or are likely to cause serious harm to public health	Regulations on emergency response to public health emergencies [5] China
	An emergency need for health care services to respond to a disaster, significant outbreak of an infectious disease, bioterrorist attack, or other significant or catastrophic event	National disaster medical system memorandum of agreement among the departments of homeland security, health and human services, veterans affairs, and defense [6] United States

5 Derivative scenarios

There are six typical derivative scenarios for built environment during 21st century public health emergencies:

— maintain indoor safety

— quarantine

— maintain hospital operation

— alternate care site

— work/study from home

— reopen

NOTE 1 Quarantine at designated places and home are effective control measures to separate suspected patients from the general population.

NOTE 2 Alternate care sites that are temporarily constructed or converted from exhibition centre, gymnasium, etc., can supplement existing medical facilities to a certain extent.

NOTE 3 In a prolonged public health emergency, people must work or study at home for a long time.

NOTE 4 Buildings that have been closed for a long time must ensure the safety and health of their occupants when reopen.

Table 2 shows the derivative scenarios emerged in typical public health emergencies of 21st century.

© ISO 2023 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 5202:2023