BS ISO 4931-1:2024

BSI Standards Publication

Buildings and civil engineering works — Principles, framework and guidance for resilience design

Part 1: Adaptation to climate change

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Buildings and civil engineering works — Principles, framework and guidance for resilience design —

Part 1: Adaptation to climate change

Bâtiments et ouvrages de génie civil — Principes, cadre et recommandations pour la conception de la résilience —

Partie 1: Adaptation au changement climatique

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Foreword

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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.

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Introduction

Adaptation to climate change has become an urgent need globally. According to the United Nations Environment Programme (UNEP)'s Adaptation Gap Report 2022, "we must also urgently increase efforts to adapt to the impacts of climate change that are already here and to those that are to come".

In the context of global climate change, buildings and civil engineering works with service lives of decades or even centuries will face new climate challenges. These challenges include the increase of frequency and intensity in extreme weather events such as heatwaves, wildfires and floods, as well as chronic changes such as sea level rise. This can result in increase of vulnerability in built assets designed based on the climate of the past decades, risking human health and well-being, and causing economic loss and social impacts. Therefore, adaptation to climate change in buildings and civil engineering works should be considered in a timely manner.

This document provides a design approach called the resilience design adaptive to climate change (RDACC), which offers specific guidance on how to produce buildings and civil engineering works with climate change resilience. It is a method for adaptation to climate change at the engineering level.

The typical actions of RDACC include:

— identifying changes in climatic impact-drivers;

— identifying resilience limits and decision making on strategies;

— monitoring and optimization;

— decommissioning.

This document is useful to stakeholders including asset owners and users, investors, authorities, standards developers, meteorologists, engineers, architects, manufacturers, builders, and other parties involved in the RDACC.

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Buildings and civil engineering works — Principles, framework and guidance for resilience design —

Part 1: Adaptation to climate change

1 Scope

The document provides principles, framework, and guidance for resilience design adaptive to climate change (RDACC) in buildings and civil engineering works. RDACC is applicable to both new construction and retrofits.

RDACC does not address:

— adaptation to climate change in the production and procurement of building materials, components and devices;

— adaptation to climate change in construction processes;

— climate change mitigation in buildings and civil engineering works;

— emergency management related to climate change in buildings and civil engineering works.

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
adaptation to climate change
climate change adaptation
process of adjustment to actual or expected *climate* (3.3) and its effects

Note 1 to entry: In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities.

Note 2 to entry: In some natural systems, human intervention can facilitate adjustment to expected climate and its effects.

[SOURCE: ISO 14090:2019, 3.1]

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3.2
asset
whole building or structure or unit of construction works, or a system or a component or part thereof

[SOURCE: ISO 15686-5:2017, 3.4.1]

3.3
climate
statistical description of the weather in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years

[SOURCE: ISO 14050:2020, 3.8.1]

3.4
climate change
change in *climate* (3.3) that persists for an extended period, typically decades or longer

[SOURCE: ISO 14050:2020, 3.8.3]

3.5
climate change mitigation
human intervention to reduce greenhouse gas emissions or enhance greenhouse gas removals

[SOURCE: ISO 14050:2020, 3.8.6]

3.6
climate projection
simulated response of the *climate* (3.3) system to a scenario of future emissions or concentrations of greenhouse gases (GHGs) and aerosols and changes in land use, generally derived using climate models

[SOURCE: IPCC, 2022]

3.7
climatic impact-driver
CID
physical *climate* (3.3) system condition (e.g. means, events, extremes) that affects an element of society or ecosystems

[SOURCE: IPCC, 2022, modified]

3.8
constraint
factor that makes it harder to plan and implement adaptation actions

[SOURCE: IPCC, 2014, modified]

3.9
existing resilience
resilience (3.17) that an *asset* (3.2) currently designed can achieve in face of the *CID* (3.7) changing to a certain magnitude

3.10
global climate model
GCM
complex mathematical representation of the major *climate* (3.3) system components (atmosphere, land surface, ocean, and sea ice) and their interactions

[SOURCE: GFDL]

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3.11
global warming level
global climate-change emissions relative to pre-industrial levels, expressed as global surface air temperature

[SOURCE: IPCC, 2022]

3.12
impact
result of a change or existing condition that may be adverse, neutral or beneficial

[SOURCE: ISO 15392:2019, 3.17]

3.13
maladaptation
actions that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas (GHG) emissions, increased or shifted vulnerability to *climate change* (3.4), more inequitable outcomes, or diminished welfare, now or in the future

[SOURCE: IPCC, 2022]

3.14
projected climatic design parameter
PCDP
meteorological parameter for buildings and civil engineering design base on *climate projections* (3.6)

3.15
Representative Concentration Pathway
RCP
scenarios that include time series of emissions and concentrations of the full suite of greenhouse gases (GHGs) and aerosols and chemically active gases, as well as land use/land cover

[SOURCE: IPCC, 2022]

3.16
required resilience
resilience (3.17) that an *asset* (3.2) is desired to have in face of a *CID* (3.7)

3.17
resilience
adaptive capacity in a complex and changing environment

[SOURCE: ISO 31073:2022, 3.3.39, modified — "of an organization" has been removed.]

3.18
resilience design adaptive to climate change
RDACC
design approach to produce an *asset* (3.2) with *resilience* (3.17) to adapt to changing climatic conditions due to *climate change* (3.4) throughout its *service life* (3.20)

3.19
resilience limit
maximum magnitude of the *CID* (3.7) that the asset can adapt to, beyond which there is no feasible strategy

3.20
service life
period of time after installation during which a facility or its component parts meet or exceed the performance requirements

[SOURCE: ISO 15686-1:2011, 3.25]

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