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Buildings and civil engineering works — Seismic resilience assessment and strategies — Compilation of relevant information

WD/CD/DIS/FDIS stage

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

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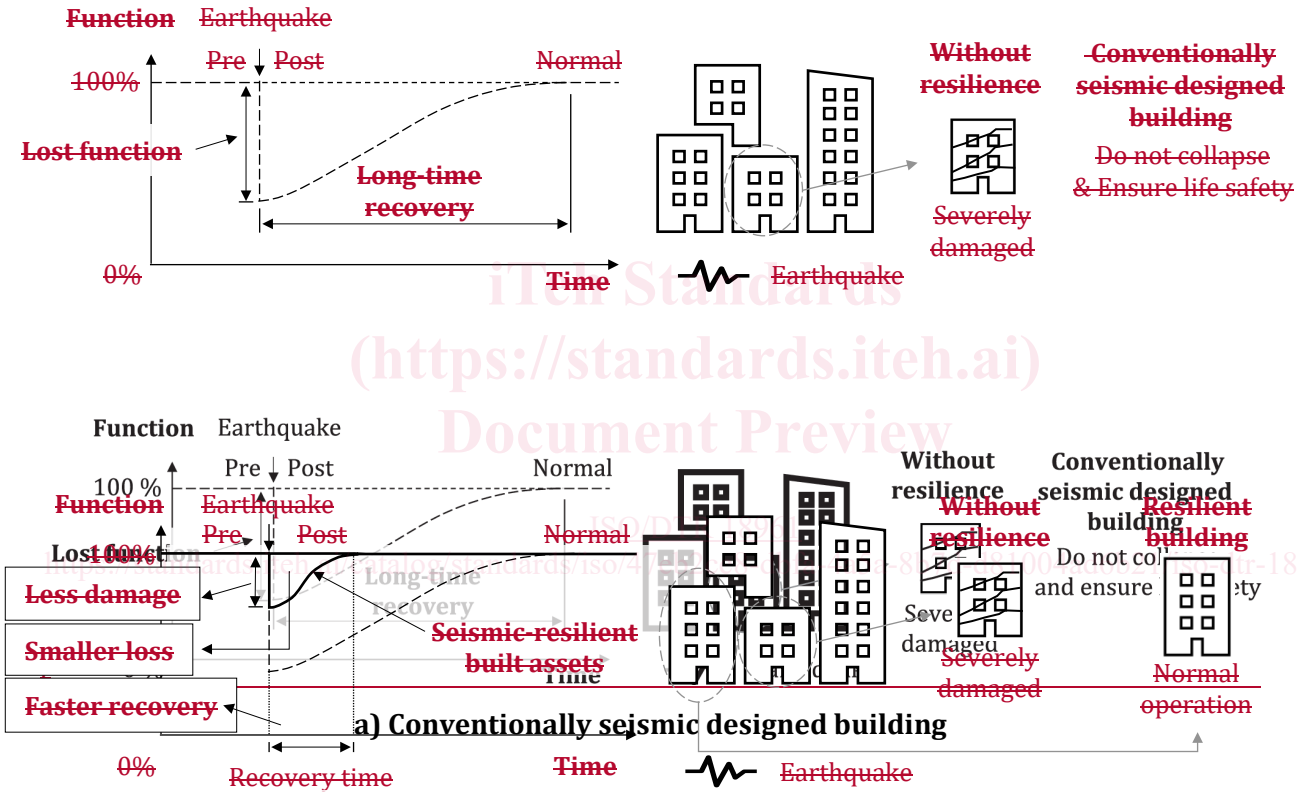
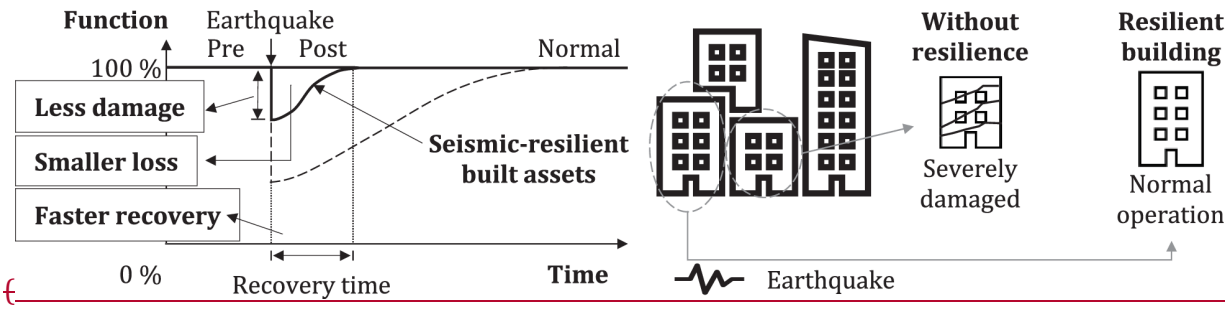
Introduction

With the issue of the "Sendai Framework for Disaster Risk Reduction 2015–2030"[1] [1], resilience for disaster risk reduction has become a global consensus. Seismic resilience, as a critical capacity for built assets, needs to be prioritized. It comprehensively considers the social, environmental, and economic aspects based on conventional seismic design, ensuring the desired recovery time, tolerable losses, and minimal casualties while preventing collapse.

As a typical example, the conventionally designed building shown in Figure 1 a(a)) underwent severe damage and lost key functions during an earthquake. By contrast, the building in Figure 1 b(b)), which was designed for seismic resilience, sustained minimal damage and rapidly regained full postearthquake functionality.





b) Seismic-resilient building

Figure 1 — Comparison between buildings designed based on conventional seismic design and seismic-resilient design concepts

Consequently, seismic resilience has emerged as a critical global concern that necessitates prioritization. Some countries have standards for assessing and boosting resilience; however, many still overlook its importance because of inadequate knowledge sharing. ISO documents on the seismic resilience of buildings and civil engineering works ~~will~~ play a critical role in raising awareness worldwide. The development of ~~an ISO Technical Report (TR)~~this document assists in gathering information on assessment frameworks, metrics~~,~~ and guidelines for improving seismic resilience.

~~From the~~The collated ~~information, readers will likely see,~~information includes the following:

— ~~—~~ ~~Concept~~concept of seismic resilience and its development history~~. Recent~~; recent earthquake disasters have underscored the need for seismic resilience, as evidenced in a typical case~~.~~;

— ~~—~~ ~~Assessment~~assessment tools for seismic resilience levels~~. Standards~~; standards, codes~~,~~ and documents were collected from various entities~~. These~~; these tools assess earthquake-related economic impacts, recovery times~~,~~ and casualties by providing assessment methods, data, information-acquisition methods~~,~~ and indicators~~.~~;

— ~~—~~ ~~Strategies~~strategies for enhancing seismic resilience~~. These~~; these were collected from investigative documents focusing on constructing newly built resilient assets and retrofitting existing assets.

The compiled information serves as a valuable resource for stakeholders, guiding them in strategizing to enhance the seismic resilience of built assets, thereby minimizing earthquake-induced damage. ~~The readership encompasses~~This document can be useful for standard setters, policymakers, users, architects, engineers, and construction and manufacturing sectors.

~~Title (Introductory element — Main element — Part #: Part title)~~

Buildings and civil engineering works — Seismic resilience assessment and strategies — Compilation of relevant information

1 Scope

This document provides an index of typical existing information on the concept, assessment, and strategy for seismic resilience of buildings and civil engineering works.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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/

4 Abbreviated terms

ASCE	American Society of Civil Engineers
DS	damage state
FEMA	Federal Emergency Management Agency, an agency of the United States
ASCEGIS	American Society of Civil Engineersgeographic information system
MOHURD	Ministry of Housing and Urban-Rural Development, a ministry of the People's Republic of China

JSCE	Japan Society of Civil Engineers
NZSEE	New Zealand Society for Earthquake Engineering
SPUR	San Francisco Bay Area Planning and Urban Research Association
SBA	Small Business Administration

NIST GCR	National Institute of Standards and Technology of the United States, Grant/Contractor Reports
NZSEE	New Zealand Society for Earthquake Engineering
JSCE	Japan Society of Civil Engineers
PACT	Performance Assessment Calculation Tool provided in FEMA P-58
PGA	Peak Ground Accelerationpeak ground acceleration
PGV	Peak Ground Velocitypeak ground velocity
GISSPUR	Geographic Information SystemSan Francisco Bay Area Planning and Urban Research Association

DS	Damage State

85 Concept of seismic resilience

Seismic resilience includes the capacity to withstand, adapt to, or promptly recover from earthquake damage to preserve or restore the intended functionality. The concept of seismic resilience is derived from the broader concept of resilience,; and its developmental history is depicted in Figure 2Figure 2..