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

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A model manuscript of a draft International Standard (known as "The Rice Model") is available at

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Foreword

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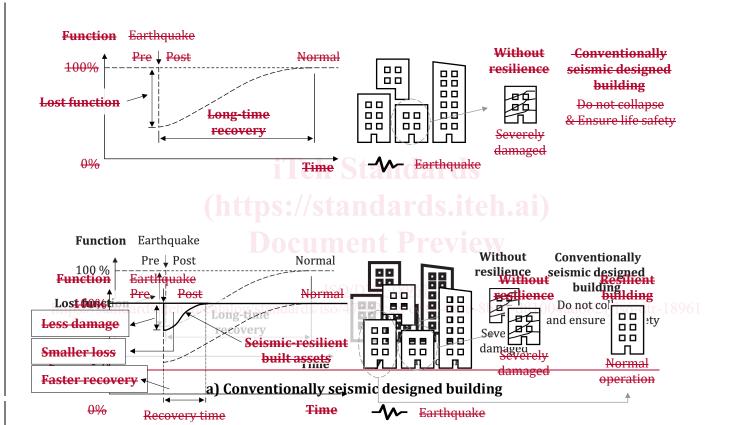
This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works ...

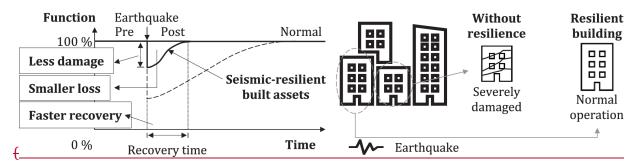
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Introduction

With the issue of the "Sendai Framework for Disaster Risk Reduction 2015–2030<u>"11" [1]</u>, resilience for disaster risk reduction has become a global consensus. Seismic resilience, as a critical capacity for built assets, needs to be prioritized. It<u>-comprehensively</u> 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 aFigure 1(a) underwent severe damage and lost key functions during an earthquake. By contrast, the building in Figure 1 bFigure 1(b),), which was designed for seismic resilience, sustained minimal damage and rapidly regained full postearthquake functionality.





b) Seismic-resilient building

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

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:

- <u>Conceptconcept</u> of seismic resilience and its development history. <u>Recent</u>: recent earthquake disasters have underscored the need for seismic resilience, as evidenced in a typical case.
- ——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—:
- <u>Strategies strategies</u> for enhancing seismic resilience. <u>These</u>; 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.

ISO #####-#:###(X/DTR 18961:(en)

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

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ISO/DTR 18961

<u>Buildings and civil engineering works — Seismic resilience</u> <u>assessment and strategies — Compilation of relevant information</u>

1 Scope

This document provides an index of typical existing information on <u>the</u> 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

<u>ASCE</u>	American Society of Civil Engineers			
<u>DS</u>	damage state Document Preview			
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			
<u>NZSEE</u>	New Zealand Society for Earthquake Engineering			
<u>JSCE</u>	Japan Society of Civil Engineers			
PACT	Performance Assessment Calculation Tool provided in FEMA P-58			
PGA	Peak Ground Acceleration peak ground acceleration			
PGV	Peak Ground Velocity peak 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 <a href="Figure 2-Figure 2-Fi

	9	19 th century
		resilience was introduced in physics
20 th -century	7	
resilience was used in medicine and psychology		1072
	Υ	1973
1981		resilience was developed as an ecological concept
	Ĭ	
resilience was used for long-term phenomena, e.g., climate change		1997
e.g., chinate change	Ĭ	resilience was applied to social systems
1997		resinence was applied to social systems
resilience was used for short-term disasters		
resinence was asea for short term alsasters	þ	2003
		seismic resilience was defined and quantified for
2010	\Diamond	communities
seismic resilience was quantified for		
complex systems	\Diamond	2013
iToh S	4	resilience was defined in the United States' presidential
2013	9	policy directive
seismic resilience was associated with		darde itab ai)
earthquake design	9	0 2015 (18.11en.21)
D		resilience was defined in Sendai Framework for
DOC 12020	9	Disaster Risk Reduction 2015–2030
seismic resilience was defined in Chinese		
national standards	þ	2020
	71	ISO/TR 22845 Resilience of buildings and civil
	/eb.	engineering works d-d81004ad6b21/1so-dtr-18961
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