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**AIJ Recommendations  
for Loads on Buildings (2015)**

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**Architectural Institute of Japan**

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Recommendations for Loads on Buildings (2015)

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## Preface

This is the English version of the AIJ Recommendations for Loads on Buildings, which was revised in February 2015. This document includes the entire text of the recommendations and a part of its commentary. The first edition of the recommendations was published in 1975 and revisions regarding wind loads and snow loads were made in 1981 and 1986, respectively. The third edition was published in 1993, in which revisions considering the principles listed below were incorporated; the English version of the third edition was published in 1996.

1. The design loads treated here are to be used in static structural analysis. Therefore, wind loads and seismic loads are evaluated as equivalent static loads.
2. To consider various design methods, the design loads, estimated as objectively as possible considering that design loads are common among various loads, must be provided. To ensure this, a probabilistic/statistical method is applied uniformly and the concept of “basic load value” is introduced, which indicates the characteristic value for each load based on statistical estimation.
3. Two design procedures are considered herein: A deterministic design procedure represented by the allowable stress design, and a probabilistic design procedure represented by the limit state design. The rationale in specifying design loads for each of these two procedures is presented.
4. For formulating or quantifying individual loads, “average” or average-like values with a specified return period of each load or of its parameters are indicated, and the information regarding their “variability” is provided.

In 2004, reparability was introduced as a performance indicator for buildings, in addition to safety and serviceability, and the limit state design was treated as the main design procedure. In 2015, the fifth edition of the recommendations was published with the following revisions.

1. Introduction of the concept of robustness as a performance indicator for buildings.
2. Introduction of the concept of accidental action.
3. Creation of a new chapter for tsunamis.
4. Creation of a new chapter for impulsive load.

Table 1 Publishing History of the Recommendations for Loads on Buildings

	Japanese version	English version
1st. edition	1975	
2nd. edition	1981 (1986 for snow loads)	
3rd. edition	1993	1996
4th. edition	2004	2006
5th. edition	2015	2018

It should be noted that a design load considered to be appropriate according to these recommendations is not always legitimate under the current Japanese National Building Code.

March 2019

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# AIJ Recommendations for Loads on Buildings (2015)

Main text

March 2018

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## CHAPTER 1 GENERAL CONCEPTS

### 1.1 Scope of Applications

These recommendations apply to the estimation of loads on ordinary buildings and similar structures or the parts thereof. Estimated loads may be used in the structural design of the buildings and their parts, and in an assessment of the structural performance.

### 1.2 Fundamental Concept

#### 1.2.1 Structural performance

Loads and their intensities shall be determined appropriately for buildings to be designed to have a proper structural performance with respect to the following factors.

(1) Safety

Buildings shall have an appropriate degree of safety against various loads. To satisfy this requirement, the appropriate loads and their intensities shall be evaluated. The appropriate degree of safety shall be determined based on social and economic circumstances as well.

(2) Serviceability

Buildings shall satisfy an appropriate degree of serviceability to avoid losing their functionality under the expected loads during normal use. To satisfy this requirement, the appropriate load intensity shall be determined for relatively frequent loads. The appropriate degree of serviceability of buildings shall be determined based on the particular importance, as well as the social and economic circumstances.

(3) Reparability

If necessary, buildings should be designed to maintain their reparability when they are damaged. The appropriate degree of reparability of a building should be determined based on the importance and social and economic circumstances.

(4) Robustness

Buildings shall be designed to be robust when suffering from unexpected type of loads or excess intensity over their design loads.

(5) Accountability of the structural engineers to the owners regarding the designed performance level

When reflecting the requests of a building owner, the structural engineer should configure the performance level of the building by considering the load states. The structural engineer should provide the owner information on the results of the design.

#### 1.2.2 Load modeling and structural analysis

Load effects in terms of stress or deformation of the structural members and/or joints are obtained from a structural analysis based on the estimated loads. Structural analysis methods and procedures are not specified in the recommendations; however, loads are estimated, in principle, for a static analysis. Dynamic loads caused by strong wind, earthquake ground motions, live loads, and tsunamis, among other factors, are evaluated for both the design as equivalent static loads.

### **1.2.3 Proper design and construction**

The intensities of the design load should be evaluated by assuming that the buildings are not only properly designed and constructed such that a reduction in safety and serviceability from human error is minimal, but also appropriately maintained and managed.

### **1.3 Terms and Definitions**

The terms used in the recommendations are defined as follows:

- Limit state: State beyond which either a structure or its parts no longer satisfy the prescribed requirements related to safety or serviceability.
- Limit state design: Design for targeted safety as well as serviceability limit states.
- Load effect: Stress, deformation, displacement, and other factors induced within the structure by single or combined loads.
- Basic value of load: Representative intensity of a load as a reference for estimation of the load effects, essentially based on 100-year return period value of the load.
- Load factor: Partial safety coefficients by which the basic values of the load effects are multiplied to obtain the design load effects.
- Return period: The expected time interval between which events greater than a certain magnitude occur.