

# Verifying Fire Engineered Solutions as part of a Building Regulatory System in Japan

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# 1. Structure of Building Standard in Japan

Building control systems and technical requirements based on the Building Standard Law (the BSL) are provided in:

- (1) The **BSL**
- (2) Official documents of the Central Government under the BSL,
  - The **Enforcement Order**, issued by the Cabinet;
  - The **Enforcement Regulation** of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT);
  - The **Ministerial Order** Concerning Designated Qualifying Examination Body and Others; and
  - MLIT **Notifications**;
- (3) Official documents of the local government under the BSL,
  - **Bye-laws** of local governments; and
  - **Enforcement Regulations** of local governments

## 2.About the BSL

- Performance-based Technical Requirements (Performance-based Codes) were enforced in 2000 in order to provide greater flexibility for the use of new and innovative building products, methods and designs in Japan.
- The BSL consists of **Requirements**(the BSL), **Performance Standard** (Criteria) (the Enforcement Order) and three **methods** (not more than) (the Notifications) to determine whether or not the solution meets Performance Criteria.

## 2.About the BSL

For the safe evacuation performance and the fire-resistance performance, there are three methods (Routes A, B and C) to determine whether the solution satisfies Building Technical Requirements.

Route A	Route B	Route C
<b>Sample Specifications</b>	<b>Ordinary Verification Methods</b>	<b>Advanced Verification Methods</b>
To determine whether or not the solution meets one of the <b>sample specifications</b> Deemed-to-Satisfy Provisions	To determine whether or not the solution meets performance criteria through <b>Ordinary Verification Methods</b>	To determine whether or not the solution meets performance criteria through <b>Advanced Verification Methods</b>

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## 2.About the BSL

Authorities concerned with the three methods (Route A, B and C) are as below:

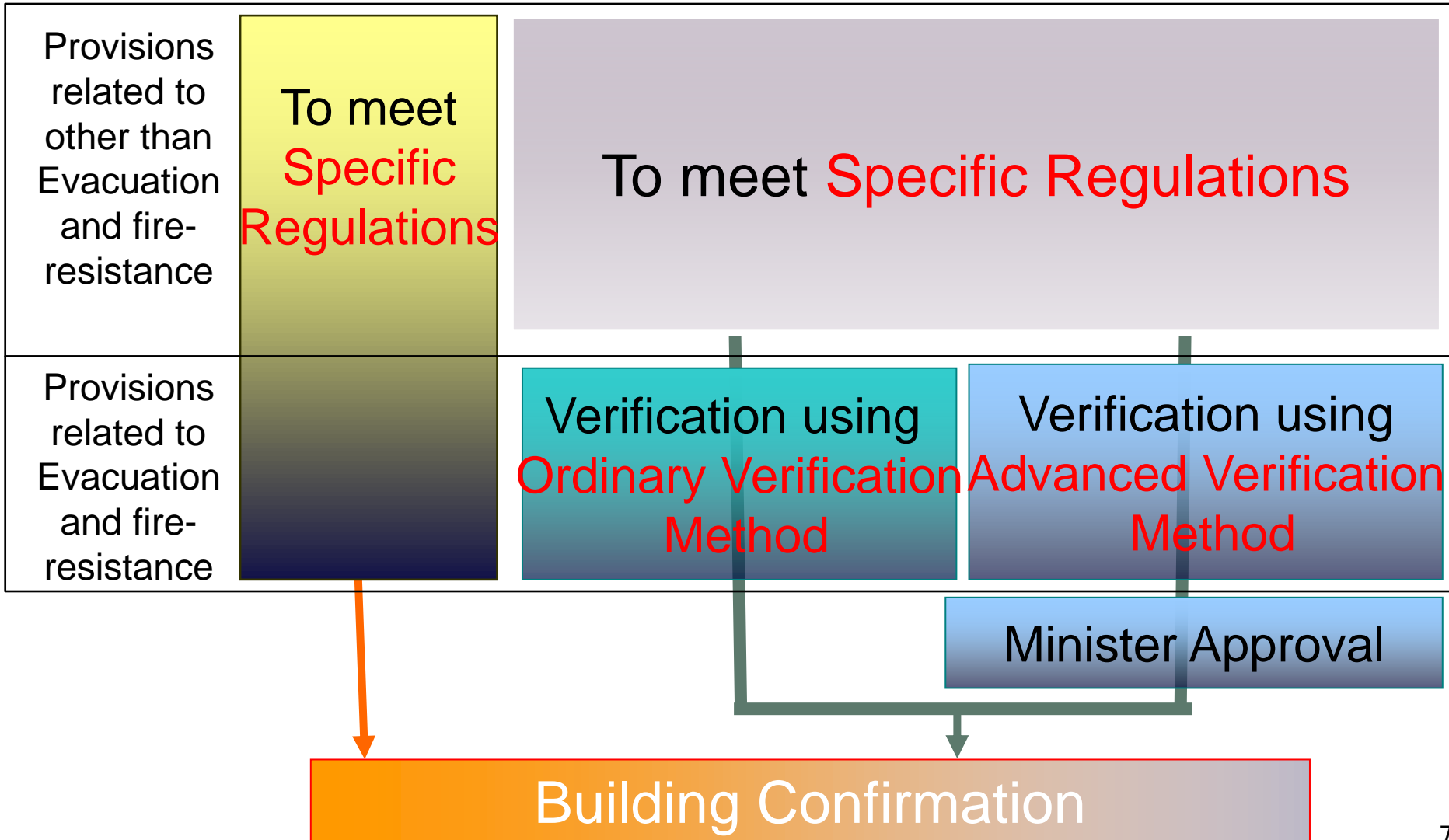
	Route A	Route B	Route C
Who issued the <b>performance criteria</b> ?	<b>The Central Government</b> (the Cabinet) issued the performance criteria.		
Who issued the <b>methods</b> ?	<b>MLIT</b> issued sample specifications	<b>MLIT</b> issued Ordinary Verification Method.	<b>No issuance</b> for Advanced Verification Method
Who judges the conformity to the BSL ?	<b>Local governments and Designated Confirmation and Inspection Bodies</b> judge the solutions.		<b>Designated performance evaluation bodies</b> evaluate the solutions based on a manual approved by the Minister, <b>then the Minister</b> approves them.

# 2.About the BSL

Route A

Route B

Route C



# 3. Fire-resistance Verification Method

The Fire-resistance Verification Method is a method based on technical standards, etc. provided in the Enforcement Order and in the MLIT Notifications, which is used to assume the occurrence of a fire in a room, and to verify that principal building parts can withstand the heat from the fire until the end of the fire. When fire-resistance is verified through this method, deemed-to-satisfy solutions for fire-resistance are not applied to the solution. The stages are as follows:

## (a) Calculation of fire duration;

- The predicted time from the start of a fire until its end is calculated, considering the volume of combustible materials, the size of openings, etc.

## (b) Calculation of heat-withstanding periods for principal building parts ;

- The periods over which principal building parts can withstand the heat by the fire are calculated, taking into consideration the type of structural methods used in the principal building parts, the heat of a fires, etc.

## (c) Comparison of (a) and (b);

- (b), heat withstanding period, must be longer than (a), fire duration.



# 4. Verification Method for Evacuation Safety

The Verification Method for Evacuation Safety is a method based on technical standards, etc. provided in the Enforcement Order and in the MLIT Notifications, which is used to check evacuation safety in fires by comparing:

- (i) the predicted time required for the evacuation of persons in a building; with
- (ii) the time during which the floors, or building, will be at risk from smoke and gas, etc,
- according to the design of the building (number of persons present, location of evacuation routes, fire and smoke prevention methods, etc.). When evacuation safety is verified through this method, some Deemed-to-Satisfy Provisions for evacuation safety are not applied to the solution. The stages are as follows:

## (a) Calculation of time until completion of evacuation;

- The evacuation time is calculated as a sum of:
- (i) the time from the outbreak of fire until the start of evacuation;
- (ii) the walking time to the exits; and
- (iii) the time lost at exits.

## (b) Calculation of time required for smoke and gas to become a hazard;

- The time is calculated for fire-related smoke and gas to descend from ceilings to reach a level at which they become hazards to evacuation, taking into account such factors as:
- (i) the floor area and ceiling height;
- (ii) the smoke exhaust assembly; and
- (iii) the types of materials used to finish the ceilings and walls.

## (c) Comparison of (a) and (b);

- (a), the time until completion of evacuation, must be shorter than (b), the time when smoke/gas becomes a hazard.

## 5. About the designated performance evaluation body

- The designated performance evaluation bodies can not do the other business related to the evaluation, such as building design etc.
- Requirements for the Approver
  - A professor or assistant professor who teaches or taught the subject related to the approval.
  - One who is or was engaged in test/research operations at test/research organizations of fields related to approval.  
and so on.

## 6. The third party check

- For structural calculation of tall buildings and equipment design of large buildings, peer review is required in the BSL.

Thank you