

# A Case of Utilizing Results

## Revision of design earthquake motion for interplate earthquakes

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### 1. Introduction

Japanese design specifications for highway bridges, which is revised in February 2012, require seismic design using two types of Level 2 earthquake motion, i.e. Type I and Type II earthquake motions. Type I represents ground motion from large-scale interplate earthquakes, while Type II from inland shallow earthquakes. Level 2, Type I earthquake motion was revised<sup>1)</sup> taking account of giant earthquakes along Nankai Trough etc. based on recent research achievement.

### 2. Revision of Level 2, Type I earthquake motion

Design earthquake motions for highway bridges are set by multiplying zone factor to standard acceleration response spectra. The standard acceleration response spectra for Level 2, Type I earthquake motion were revised as shown in Figure 1 based on the ground motion in Tokyo area during the 1923 Kanto earthquake estimated by new attenuation relationships developed by NILIM.

Zone factors applied to Level 2, Type I earthquake motions were also revised taking account of giant earthquakes along Japan Trench and Nankai Trough. The zone factor was set to 1.2 in the area where ground motion intensity was estimated larger than that in Tokyo area during the 1923 Kanto earthquake (Figure 2).

Furthermore, acceleration waveforms were produced by spectral fitting using strong motion records from the 2003 off Tokachi and the 2011 off Tohoku earthquakes as original waveforms for seismic design using time history response analyses.

### 3. Ongoing action

Successive research has been conducted towards

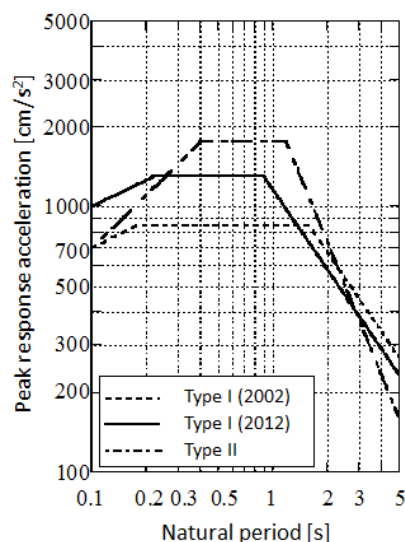


Figure 1 Comparison of standard acceleration response spectra for Level 2 earthquake motion (Soil type II)

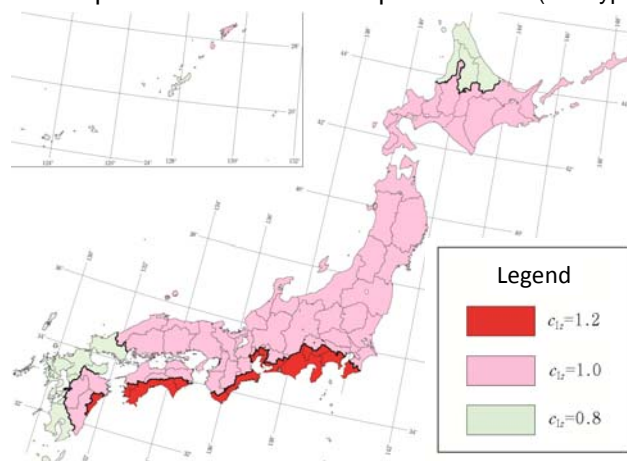


Figure 2 Zone factors (Level 2, Type I earthquake motion)

further improvement of the design earthquake motions following the latest knowledge of giant earthquakes that occur on plate boundaries as well as long active faults.

[Sources]

1) Kataoka, S. (2012), "Revised design earthquake motion and the effects on seismic design of highway bridges," *Proceedings of the 28th U.S.-Japan Bridge Engineering Workshop*, Portland, Oregon, USA.