

# Support for revision of the seismic design criteria for highway bridges in Chile

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## 1. Introduction

The Chilean Ministry of Public Works had been working on revising the seismic design criteria for highway bridges since the 2010 Chile earthquake (M8.8) caused extensive damage to bridges (photo 1). The Japan International Cooperation Agency (JICA) initiated a technical cooperation project entitled “Seismic Design Criteria for Highway Bridges” on September 2014 in support of the revision work. The National Institute for Land and Infrastructure Management (NILIM) and the Public Works Research Institute (PWRI) have provided technical support<sup>1</sup> in cooperation with industrial and academic experts in earthquake engineering based on a request from the Chilean government through JICA.



Photo 1 Bridge unseating during the 2010 Chile earthquake



Photo 2 Discussion among Chilean and Japanese engineers (Feb. 2017)

Japanese engineers were dispatched to Chile as JICA short-term specialists four times. Teleconferences were held in 2015 and 2016, and Chilean engineers were dispatched to Japan for discussions on the seismic design criteria for more than two days in each 2016 and 2017 (photo 2).

## 2. Results of the technical cooperation

Japan has experienced many earthquake disasters and developed technical criteria based on cumulative lessons learned from the experience and various research results on seismic technologies. We have discussed how to apply the made-in-Japan seismic technologies to Chilean design criteria and reached the conclusion that it is effective for improving the seismic safety of bridges in Chile to incorporate Japanese seismic technologies, such as the design methods against liquefaction and the unseating prevention system; the seismic design criteria for highway bridges in Chile was revised in consideration of these technologies in June 2017.

Commending the contribution from the technical cooperation, the Chilean Ministry of Public Works complemented the specialists from NILIM and PWRI with diplomas.<sup>2</sup>

## 3. Ongoing and future actions

During this technical cooperation, technical support for a wide range of seismic technologies was provided, including a revision of the protocol for earthquake ground motion, bridge monitoring guidelines, standard testing methods of anti-seismic bearings, and other protocols. In order to reach these goals, further investigations are necessary in consideration of the differences in available data and instruments in Chile and Japan. We will continue our support for formulating related guidelines and manuals based on the results from this technical cooperation through discussions and by providing information on Japanese cutting-edge seismic technologies.

[Sources]

- 1) *Civil Engineering Journal*, No. 59-7, pp. 48-49, 2017.7.
- 2) Press Release, December 1, 2017  
[http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20171201\\_2.pdf](http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya20171201_2.pdf)