

Impact of Transfer of Structural Experiment Technology to the Research Institute for Human Settlements, Ministry of Public Works in Indonesia

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1. Introduction

A lesson taught by the disaster caused by the Kanto Earthquake of 1923 (Report by the Imperial Earthquake Investigation Committee, No. 100, Part 3, Vols. 1 and 2, 1926) was that a public testing institute must be established with the ability to verify not only the economic merits and efficiency of building production, but also the safety and rationality of building structures, and to achieve this goal, to provide standards and verify the performance of buildings. Immediately after World War II, Japan established the National Research Institutes, which performed structural testing at universities and private sector research institutes, and now plays a leading role in this field in international society. This report describes the results of the transfer of structural experiment technology to the Research Institute for Human Settlements of the Ministry of Public Works (<http://puskim.pu.go.id>) of Indonesia and to the **structure division**, which receives technical assistance from Japan.

2. Background to the technology cooperation

Indonesia is located in an earthquake zone where it is important to ensure structural safety, and the Research Institute is, as the only national testing organization in the housing construction field, responsible for this task. The Research Institute built a building (site area: 96ha) with interest-free investment support by Japan in 1990 under the Bandung Science City Concept Plan, and has moved to Cileunyi about 16km to the east of Bandung. Later, the Government of Indonesia requested that Japan provide technical assistance with the development of collective dwellings suitable for low-income people (periods: 1993 to 1998 and 2005 to 2007), and the Ministry of Land, Infrastructure, Transport and Tourism (then the Ministry of Construction) provided this assistance as an organization specializing in the field. The author, then an expert in the charge of the structural field of this technical assistance monitored the effectiveness of the transfer of structural experiment technology and its impact on the building construction industry in Indonesia from the beginning to the conclusion of the project.

3. Contents of the technological transfer of building component structural experiment methods

1) We built experimental equipment which could be used to test columns, beams, walls and other structural members of medium to high buildings, enabling the center to satisfy housing construction policies and meet social needs as a public

institution.

2) The functions of the experimental equipment include the ability to apply axial force to perform positive – negative cyclic horizontal loading of members in order to verify their strength, deformation, failure properties etc. (Photo 1).

3) The equipment places a light maintenance burden on its users.

4) The test organization included researchers who had completed study and training in earthquake engineering (Building Research Institute, International Institute of Seismology and Earthquake Engineering (IISEE))



Photo 1. View of an Element Structure Test (White Part: Specimen)

4. Impact of the transfer of the structural experiment technology

1) The Research Institute center has systematized the verification and confirmation of structural performance thanks to its ability to conduct experiments adding compound forces to building structure members, and has been carrying out housing building production related development. In 1999, it established the Prestressed - Precast Association.

2) Building methods it has developed have been applied by the Ministry of Housing and regional governments to build collective dwellings and university dormitories throughout the country. The center has studied the reconstruction of school buildings damaged by the Padang Earthquake of September 2009.

3) Researchers who studied at the IISEE in Japan are working in the structure division of the Research Institute and in the private sector, contributing to the improvement of safe building production technology in Indonesia.