International Video Workshop 2009 on Safer Housing
Focusing on Confined Masonry Structures

1. Date (Japan Time)

March 23(Monday), 2009 16:00 - 21:00

2. Venues

JAPAN

- Tokyo – (Main Venue) World Bank Tokyo Development Learning Center (TDLC)
- Tsukuba – Building Research Institute (BRI)

INDONESIA

- Jakarta – JICA Indonesia Office
- Bandung – Bandung Institute of Technology
- Yogjakarta – Gadjah Mada University
  – Universitas Islam Indonesia

NEPAL

- Kathmandu – JICA Nepal Office

PAKISTAN

- Islamabad – JICA Pakistan Office
- Peshawar – NWFP University of Engineering and Technology Peshawar (UETP)

TURKEY

- Istanbul – Bilgi University
- Ankara – JICA Turkey Office

4. The number of the participants

Venue	Countries	turnout
Tokyo（Main Venue）	Japan	30
Tsukuba	Japan	11
Jakarta	Indonesia	2
Bandung	Indonesia	3
Yogyakarta	Indonesia	16
Kathmandu	Nepal	18
Islamabad	Pakistan	8
Peshawar	Pakistan	23
Istanbul	Turkey	8
Web Streaming services		9
TOTAL		128

5. Language

English/Japanese (simultaneous translation)

枠組み組積造の耐震性向上に関する国際ビデオワークショップの開催概要

＜振動台実験結果、壁体繰り返し加力実験結果、現地建設状況調査報告を中心に＞

1. 日時

	2009 年 3 月 23 日（月）
日本	16:00 － 21:00
インドネシア	14:00 － 19:00
ネパール	12:45 － 17:45
パキスタン	12:00 － 17:00
トルコ	09:00 － 14:00

2. 開催地

下記の5ヵ国を世界銀行グローバル・ディスタンス・ラーニング・ネットワークのビデオ会議システムで繋いで実施。

- 主会場：世界銀行東京開発ラーニングセンター（内幸町富国生命ビル）
- 国内サブ会場：建築研究所（つくば市）
- 海外サブ会場：インドネシア（ジャカルタ、バンドン、ジョグジャカルタ）
  ネパール（カトマンズ）
  パキスタン（イスラマバード、ペシャワール）
  トルコ（イスタンブール、アンカラ）

3. 参加者

場所（国）		参加者数
東京（主会場）	日本	30
つくば	日本	11
ジャカルタ	インドネシア	2
バンドン	インドネシア	3
ジョグジャカルタ	インドネシア	16
カトマンズ	ネパール	18
イスラマバード	パキスタン	8
ペシャワール	パキスタン	23
イスタンブール	トルコ	8
ウェブ・ストリーミング・サービス		9
合計		128

4. 言語

日本語及び英語（日英の同時通訳を行います）

Summary of discussions/comments during Q & A times

- **Affect of the first earthquake occurred before the second (big) earthquake**
  Dr. Toshikazu Hanazato, Mie University: Actually there was some impact from the first earthquake.
  Dr. Tatsuo Narafu, BRI: Accumulation of the defect is a very important point and we have to take in account the already made cracks in order to analyze this result.

- **Difference of strength in brick bond between Pakistan brick and Japanese brick**
  Dr. Toshikazu Hanazato, Mie University: Bonding strength between brick and mortar was less in Pakistan brick than Japanese brick. Same mortar was used for both types of brick. Tensile strength between brick and mortar was 0.525 Newton for Pakistan brick and 0.7 Newton for Japanese brick in average.

- **Influence of the soaking**
  Dr. Tatsuo Narafu, BRI: If we construct walls without soaking, the brick will absorb water and it will influence mortar strength. That influence has to be identified but we think it will not affect largely because strength of mortar completely depend on water ratio. Strength of brick is not so much influential as we do not see bricks that had been broken. Most failure occurs on cement mortar.

- **Different conditions of brick surface**
  Dr. Tatsuo Narafu, BRI: The fact that the wall made by Japanese brick did not collapse while the Pakistan brick did, tells us that brick surface is very influential. Surface condition affects a lot on bonding strength.

- **Comparative studies**
  Dr. Tatsuo Narafu, BRI: We have just conducted a comparative study of different conditions of cement. We followed the usual testing method of compression for cement. But the point is not compression strength but bonding strength. We need further research.

- **Cement / water ratio for different weather conditions**
  Dr. Tatsuo Narafu, BRI: In places like Indonesia where rainy season exists, strength of mortar may not be controlled well because weather condition differs by season (moisture / dry). Further investigation on this point. (Report on the condition of Indonesia will be contained in Mr. Shirakawa's presentation later.)

- **Difference between the LED image processing and other conventional measurements**
  Dr. Yasushi Niitsu, Tokyo Denki University: For this experiment we did not compare it with other measurements but for other experiments in Japan, we regularly compare them with shaking table experiment and the resolution accuracy is better than 1 mm for 10 m large space.

- **Better way to make confined masonry a safer structure**
  Dr. Toshikazu Hanazato, Mie University: Any defect will affect seismic capacity more than strength of materials. You need to look at how the perfection is being done.
  Dr. Chikahiro Minowa, NIED: Lintel reinforcement as well as wire mesh has significant effect in reinforcement. It can be said that structure collapse have some kind of defect in the building.

- **Toughness of brick**

  Mr. Teddy Boen, Indonesia: Indonesian masonry brick is very very weak. Indian, Pakistan, and Nepal brick is very strong.

- **Basic difference between "Himis" and the other timber reinforcement "Badadi"**

  Dr. Ahmet Turer (or Dr. Altug Erberik), Middle East Technical University: Badadi has a completely wooden front panel which is covered with thin layer, and it is filled with clay mud. Himis has its surface exposed and it is not covered with any plaster on surface. Badadi, whose whole surface is covered with wooden confinement, can be explained as a confined masonry but not being reinforced by cement.

- **For confined masonry with timber, which comes ahead, frame or infill?**

  Dr. Ahmet Turer (or Dr. Altug Erberik), Middle East Technical University: If there is too much wood, it can be called a structure with masonry infill, but with less wood, it can be called masonry with wooden strength.

- **Laboratory tests on to find out minimum diameter of timber.**

  Dr. Ahmet Turer (or Dr. Altug Erberik), Middle East Technical University: Some tests had been implemented but I do not have the data.

- **Type of connection of confined masonry with timber**

  Dr. Ahmet Turer (or Dr. Altug Erberik), Middle East Technical University: Connection is made of nails and what is discovered so far is that the strength depends on nails. Number of nails causes difference and wood does not fail but separates. There is not much study in Turkey on wooden confined masonry and we are now working on it.

  Dr. Toshikazu Hanazato, Mie University: We will start a research on seismic safety of timber composite brick masonry from coming April with shaking table experiment. We will present it next year.

- **Construction workers in Indonesia**

  Ms. Shizuko Matsuzaki, EVAA: Many construction workers regularly work for other occupation (mainly farmer) and they build houses only for family members. Professional workers are called from time to time when needed. Worker skill problem still exists.

  Ms. Dyah Kusumasututi, ITB: Drawings vary from place to place and some just show big elements (column, etc.) and do not provide specification on other factors such as join, etc. Their problem is not only technical but their idea of how the construction should be.

- **Comment on quick report of cyclic loading experiments on confined masonry in Bundung**

  Mr. Wira, ITB: Best specimen is Model F because it realizes high resistance and long activity before collapse. Also its structure is simple than lintel model beam.

  Ms. Dyah Kusumasututi, ITB: When designing the structure, not only strength capacity but also ductility should be considered. Model G reaches the maximum force but degrades rather quickly. In this point Model F has comparative advantage. Model F seems to be the best but further research is needed.

- **Specimen used in experiment by Gadjah Mada University**

  Mr. Iman Satyarno, UGM: Reinforcement by plaster using "1 cement: 2 sand". Its compression strength was around 23 MPA, which is quite high compared to common masonry brick wall (2~5 MPA). We put wire mesh on the wall and plastered it for about 2 cm. Improvement was only made by the plaster and reinforcing bars and diameter of column and ring beam were the same.

- **RC frame used in experiment by Gadjah Mada University**

  Mr. Iman Satyarno, UGM: We took off all the brick and replaced them with RC. We didn't plaster the wall. Concrete quality was 19.52 MPA, which was slightly less than compressive strength of plaster (23.33 MPA). Our suggestion is, in order to confine brick masonry wall you should put plaster to improve safety.

- **Placement of plaster and prevention of cracks**

  Mr. Iman Satyarno, UGM: Plasters were on both sides. The wall had no crack at all. However strengthening of house didn't comply with earthquake resistant requirements. You just have to put plaster on the wall. It is proved in the lab that plaster can improve strength of the walls and also change the failure of the wall due to rocking.

- **Cost of plaster used in experiment by Gadjah Mada University**

  Mr. Iman Satyarno, UGM: "1 Cement :2 sand" plaster will be quite expensive for common or new houses with confinement elements (column, reinforcement bars, ring beam) so I would suggest "1 Cement :4 sand". For a house with no column or ring beam (like ones we found in Yogyakarta) retrofitting by "1 Cement :2 sand" won't be expensive.

東京会場風景

各会場風景

東京会場発表風景

海外からの発表風景１

東京会場発表風景（海外からの招聘者）

会場風景（質疑応答、コメント）