

JPCI NEWSLETTER

No.11, October 2018

Japan Prestressed Concrete Institute

JPCI AWARD

Award for Outstanding Structures



• Dinh Vu - Cat Hai Bridge

Location : Hai Phong, Vietnam

Bridge Length : 5,443m (Approach Bridge Hai An side (HAB); 4,434m + Main Bridge (MB); 490m + Approach Bridge Cat Hai side (CHB); 519m)

Width : 16m (effective width 15m)

Structural Type : HAB; 5 Spans Continuous PC Box Girder Bridge (75 spans), MB; 4 Spans Continuous PC Box Girder Rigid-frame Bridge, CHB; 4-5 Spans Continuous PC Box Girder Bridge

Erection Method : HAB; Precast Segment - Span by Span Erection Method, MB & CHB; Cast in Situ - Balanced Cantilever Method

Foundation Type : HAB & CHB; Steel Pipe Pile with Slip Layer, Bored Pile, MB; Steel Pipe Sheet Pile Foundation

Design : Oriental Consultants Global - Padeco - Nippon Koei - Japan Bridge & Structure Institute JV

Construction: Sumitomo Mitsui Construction - Truong Son - Cienco4 JV



• CoFuFun, Tenri station square

Location : Tenri, Nara-pref.

Outline of Structure : Pre-cast prestressed concrete (PCaPC) construction method was adopted for "Fuwafuwa Cofun" and "Info & Lounge Cofun".

A circular staircase shaped structure with a diameter of 26,000mm is made of Pre-cast concrete members radially divided into 36 pieces. Prestressing is introduced in the circumferential direction and it is made by crimping. The PCaPC method realizes an impressive design with high precision.

Owner : Tenri-city

Design : Oki Sato, Nendo Inc.

Construction: P.S. Mitsubishi Construction Co., Ltd.



● **Shibata City Hall**

Location : Shibata, Niigata-pref.

Outline of Structure : The floors of the building are separated by function into a lower and upper part with three and four floors respectively: public area (window function and lobby, etc.) is located in the low-rise part, and government area (office, machine room and assembly hall, etc.) is located in the high-rise part. The structural system adopted the principle of the suspension bridge in order to realise a flexible and long span space. The low-rise part under isolated floor is the concrete shear wall structure which is possible to express peripheral volume like a stiff foundation and the high-rise part above upper isolated floor is the steel suspended structure like a light ‘cloud’ that does not feel oppressed around the building. On the low-rise part, we adopted the large void slab post-tensioned with rational measurement of approximately free 25m span to form a moment frame with a shear wall.

Owner : Shibata-city

Design : aat+makoto yokomizo architects, Inc., Arup

Construction: Taisei-Shibata-Ito JV

Award for Outstanding Structures, Renovation



● **Yamanashi- Bunkakaikan Seismic up-grading project**

Location : Kofu, Yamanashi-pref.

Outline of Structure : Fifty years have passed since completion, Yamanashi-Bunkakaikan is known as a representative work of Kenzo Tange, having unique design that 16 cylindrical columns with a diameter of 5m support the building. Seismic up-grading work was carried out to keep using for the next 50 years.

In this construction work, the mid-story seismic isolation at the second basement floor was adopted not to stop daily work without changing exterior design. Although installing works of isolation devices by cutting cylindrical column was extremely difficult, by planning to maximize the effect of prestressed concrete structure for the isolation device foundation, construction was able to be carry out with safety and functionality.

Owner : Yamanashi-Bunkakaikan co.,Ltd

Structural Design : Orimoto Structural Engineers

Construction : Sumitomo Mitsui Construction co.,Ltd

Award for Outstanding Engineering Innovations



- **Self-Propelled Stay-Cable Inspection Device**

Location : Nagoya, Aichi-pref.

Outline of Innovation : Cable-stayed bridges and extradosed bridges are composed of girders, towers and stay-cables. The most important components are the cables. Therefore, it is essential to maintain the cables properly. The inspection of cable-stayed and extradosed bridges is generally conducted by visually inspecting the protection pipes. However, it is difficult to apply the visual inspections when the cables are attached to the upper reaches of the tower. In addition, we cannot confirm the condition of the steel materials in the protection pipes with visual inspection. Therefore, we have developed a self-propelled stay-cable inspection device equipped with video cameras which allow us to examine the exterior of the protection pipe and an inspection sensor which can detect the rupture of internal steel materials.

Innovator : Central Nippon Expressway Company Limited

Award for Outstanding Accomplishments of Constructions



- **Reinforcement work for Sawasokogawa Bridge on Chuo Expressway**

Location : Tatsuno-cho, Kamiina-gun, Nagano-prefe.

Structure overview : Sawasokogawa Bridge is a three-span PC continuous composite girder bridge with a bridge length of 70 meters which has been around for 35 years since the start of service. The reinforcement work was carried out for the first time in Japan, the first full reinforcement work to remove all the primary deck near the intermediate fulcrum and the slab connecting cable and to reinforce with the floor slab replacement and external cable.

Provider : Central Nippon Expressway Co., Ltd. Hachioji branch office

Design : Oriental Consultants Co., Ltd.

Construction: Oriental Shiraishi Co., Lt



● **Replacement of deck slab work for Michitani bridge No.2 at Chugoku Expressway**

Location : Shyunan and Yamaguchi, Yamaguchi-pref.

Structure overview : Michitani bridge No.2(inbound lane) at Chugoku Expressway is 3-span continuous non-composite plate girder bridge which has been in service for 36 years, and the length of the bridge is 115 m. Because of salt erosion, we replaced RC-Slabs with Precast PC-Slabs under open traffic. When we use the traditional constriction method, we have to close the whole width of inbound lane to replace the RC-Slabs. But inbound and outbound lanes are separated, so we have to close a large traffic area. And the construction spot is near SA・PA, the flow of traffic is difficult under construction. So, we developed a new technique for replacement of RC-Slabs under open traffic to solve these problems.

Provider : West Nippon Expressway Co., Ltd.

Design : P.S. Mitsubishi Construction Co., Ltd.

Construction: P.S. Mitsubishi Construction Co., Ltd.



● **Shiokawa Bridge of the Shin-Meishin Expressway**

Location : Kawanishi, Hyogo-pref.

Structure overview : The inbound lane is 97.0 m long, PRC box-girder continuous rigid frame with two spans. Since the bridge crosses over the national road and the river between P1 and A2, the length of P1 and A2 is twice the length of A1 and P1. The outbound lane, 233.5 m long, was a PRC box-girder bridge of continuous rigid frame with three spans. The length of cantilever was 89.2 meters long on one side. This cantilever length is one of the longest PC bridges in Japan using the same type and the same construction method. Initially, the abutments of A2 were planned to be constructed from the tunnel side. However, construction was changed to start from the forefront of the outbound lane superstructure of a longest cantilevering..

Provider : West Nippon Expressway Co., Ltd.

Design : P.S. Mitsubishi Construction Co., Ltd. and Nippon Engineering Consultants Co., Ltd.

Construction: P.S. Mitsubishi Construction Co., Ltd.

EVENTS

Annual Symposium
- The coming symposium -

The 27th Symposium on Developments in Prestressed Concrete

8th - 9th November 2018

Matsuyama, Japan

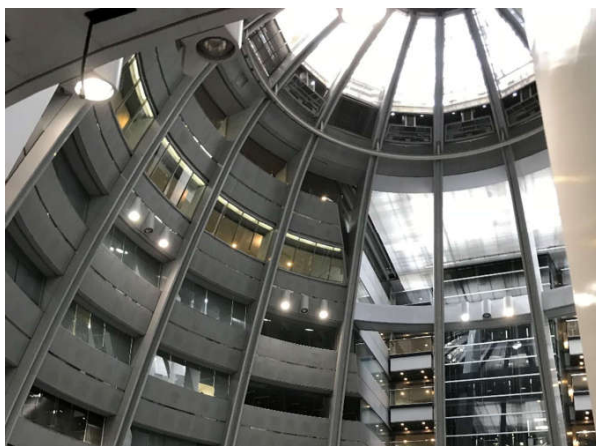
<http://www.jpici.or.jp/eng-index.htm>

Topic of the next symposium is special lectures. After the opening ceremony, Mr. Theodore L. Neff, Executive Director of PTI (Post-Tensioning Institute) and Mr. Keiji Matsumoto, Director of the SAKA NO UE NO KUMO MUSEUM, will give special lectures.

- The last symposium -

The last symposium, “the 26th Symposium on Developments in Prestressed Concrete”, was held on 26th and 27th October 2017 at the Kobe Fashion Mart in Kobe. The purpose of the symposium is to attain further development of prestressed concrete technology by sharing valuable information among researchers.

Previous to the symposium, the Workshop was held. Activities of committees of the JPCI were reported. Professor Kimitaka Uji, chairman of the Committee presented “Research Committee on PC Structures Applicable to Large Scale Natural Disasters”. Mr. Takashi Kosaka, Hanshin Expressway Co., Ltd. presented “Large scale renovation and repair project on the Hanshin Expressway”.



Venue, Kobe Fashion Mart



Opening ceremony



Dr. Hugo Corres



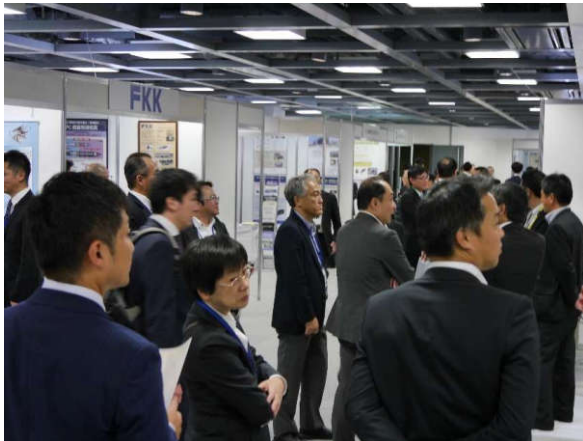
Mr. Kiyoshi Morita

In the Opening Ceremony Dr. Susumu Inoue, professor of the Osaka Institute of Technology, the chairman of the Executive Committee of the symposium, gave an opening address. History and outline of the symposium were introduced. Dr. Kimihiko Uji, professor of the Tokyo Metropolitan University, president of the JPCI gave an opening speech. Then, Mr. Masamichi Hashimoto, Director of the Road Department of Kinki Regional Bureau, Ministry of Land, Infrastructure, Transport and Makoto Yoshii, General Manager of the Port of Kobe gave speeches of greeting.

Dr. Hugo Corres, President of the *fib*, Professor of Technical University of Madrid, Spain and Mr. Kiyoshi Morita, Councillor of Port of Kobe Japan were invited and gave special lectures.

Dr. Hugo Corres presented “Conceptual design. An essential tool to create/produce sound structures”. Conceptual design is the process to find a solution for a given problem. It is a creative process. It is the birth of an idea. It is not exclusive to our structural engineering profession. It is a common process in any creative activity. Creativity is a skill that is acquired in time. It requires solid and extensive engineering knowledge, in many different subjects. It is not possible to solve a problem which is not well known. It requires a rich culture, sensibility and great ambition. It requires experience that is a process of learning from successes and failures. Conceptual design is a process engineers must follow to solve many different problems in design, at different moments and at different levels. In order to find the general solution for a given problem. To find the right construction process for the solution. To solve different details. The *fib*, international federation of structural concrete, has introduced this concept for the first time in Model Code 2010, as the initial and most important activity in the design process. At present, in the preparation on the Model Code 2020 this subject will be reviewed and improved. We, structural engineers, who face structural problems in different stages of the lifetime of the structure, have many different opportunities to make good conceptual design. Engineers are able to create like artists, Picasso, or like architects, Apollodorus of Damascus or Norman Foster. We need only to strongly believe on that and work for that belief. We have always new problems to solve. We need to educate our students not only the basic engineering subjects but also we need to educate them in how to do good conceptual design.

Mr. Kiyoshi Morita presented “The 150th Anniversary of the Port of Kobe / History of the Port of Kobe”. The Port of Kobe was opened in 1868, 150 years ago. The reasons why the Port



Technical exhibition



Parallel session

of Kobe has been developed are as follows, 1) the Cape Wada moderates the influence of the tide of the Akashi Strait, 2) enough water depth for large ships entering the port, 3) the Rokko Mountain located in the north and the Awaji island located in the west protect north and west wind in winter, 4) easy to anchoring and weighing anchor because the ocean floor is formed of sand and clay layer, 5) easy to cargo handling because the difference in tidal is around 1 meter a year 6) the climate in Setouch is relatively mild and less rainfall, 7) good location as it is near the Saigoku Kaido Road. Before 40's in Showa era, the number of pier was insufficient, and unloading from ships were carried out using barges. Then the Port Island and the Rokko Island were constructed in order to allow cargo handling at the pier. Kawasaki Heavy Industries and Mitsubishi Heavy Industries had done a lot of shipbuilding including battleships. Currently, Mitsubishi Heavy Industries does not build merchant ships, but both companies are building submarines of the Ministry of Defense.

In order to exchange information concerning activities, researches and original technologies 41 groups participated in the technical exhibition. Companies and organizations including the City of Kobe and the Port of Kobe displayed their current information in the booths provided for the Technical Exhibition. Presentations were made by 9 exhibitors and active discussions for each presentation were made in the exhibition hall.

In the last symposium, 50 contributed papers, 101 reports and 5 introduction of research were



Workshop



Award of excellent presentation

presented in 17 sessions. The participants were 676. From each session, the most excellent presenters were chosen and were given “Award of Excellent Presentation”. Prize winners are as follows.

- Session 1: *Hidenori Kuroda*, Kawada Construction Co., Ltd.
- Session 2: *Akiyoshi Fukuda*, Oriental Shiraishi Corporation
- Session 3: *Keita Sugimoto*, Ngoya University
- Session 4: *Takahiro Kawahara*, Tokyo Institute of Technology
- Session 5: *Takashi Sanga*, Sumitomo Mitsui Construction Co., Ltd.
- Session 6: *Kazumasa Okubo*, Kajima Corporation
- Session 7: *Shyoichi Nishimaki*, Sumitomo Mitsui Construction Co., Ltd.
- Session 8: *Yuichi Kitano*, Japan Prestressed Concrete Contractors Association
- Session 9: *Jun Shibayama*, Central Research Institute of Electric Power Industry
- Session 10: *Yuji Iwase*, Kawada Construction Co., Ltd.
- Session 11: *Atsushi Fujioka*, P.S. Mitsubishi Construction Co., Ltd.
- Session 12: *Shyuji Yanai*, Kajima Corporation
- Session 13: *Hirokazu Nakase*, P.S. Mitsubishi Construction Co., Ltd.
- Session 14: *Masato Fukuda*, West Nippon Expressway Co., Ltd.
- Session 15: *Akira Watanabe*, Sumitomo Mitsui Construction Co., Ltd., Nippon P.S Co., Ltd., and Yokogawa Bridge Corporation JV
- Session 16: *Satoru Nagaoka*, Fuji P.S Corporation
- Session 17: *Tsutomu Watanabe*, Railway Technical Research Institute

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- This newsletter contents current information on the activities and topics of JPCI.
 - If you have any comments and suggestions, please contact us by sending e-mail to: kaiinka24@jpci.or.jp

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