JPCI NEWSLETTER

No.16, February 2025

Japan Prestressed Concrete Institute

JPCI AWARD

Award for Outstanding Structures
- Civil Engineering Structures Category -

● **Kuzuryu River Bridge / Shin-Kuzuryu Bridge**

(Journal of the 29th Symposium on Developments in Prestressed Concrete; Journal of Prestressed Concrete Japan, Vol.63 No.2; Bridge and Foundation Engineering, March 2023)

Location : Fukui City, Fukui Prefecture

Outline of Structure :

The Kuzuryu River Bridge for Shinkansen / Shin-Kuzuryu Bridge for the prefectural road is a combined use bridge shared by the Shinkansen line and the roadway. What is unique about this bridge is that the girders of the two shares the same piers and two entities (JRTT and Fukui prefecture) worked together to achieve this project. Since the piers were shared, seismic design was implemented to meet both Shinkansen and roadway standards. The number of piers could be reduced by sharing piers, thereby minimizing construction costs, and shortening the overall process, as well as mitigating the impact on the river environment. This bridge has become a landmark of the town, revitalizing the community.

Client : Japan Railway Construction, Transport and Technology Agency (JRTT), Hokuriku Shinkansen Construction Bureau
Fukui Prefecture Fukui Civil Engineering Office

Design : Yachiyo Engineering Co.,Ltd. (YEC)
Kouzou sekkei Co.,Ltd.

Construction : Joint Venture of Tekken Corporation, AbeNikko Corporation and Shimizugumi for Construction of Kuzuryu River Bridge in Hokuriku Shinkansen
NIPPON P.S CO., LTD.

● **Shimogo Bridge**

(Journal of Prestressed Concrete Japan Vol.64 No.1; Journal of Prestressed Concrete Japan Vol.65 No.5; Bridge and Foundation Engineering, May 2022)

Location : Minami-Aizu Country, Fukushima Prefecture

Outline of Structure :

The Shimogo Bridge is constructed on the Onumazaki Bypass section of National Route 118, with a bridge length of 342.5 meters. It is an upper deck RC fixed arch bridge with an arch span length of 200.0 meters. This bridge ensures both a chromatic harmony with the evergreen and autumn foliage along the Aga River and a morphological harmony with the Aga River Valley. The construction of this bridge contributes to ensuring safe and smooth traffic, improving convenience, promoting industry, expanding exchanges, and accelerating the reconstruction of Fukushima Prefecture. During the construction process, the double pylon construction method was adopted for the first time in Japan. One type of pylon used is the end pylon, while the other type is a steel pylon installed on pre-constructed arch ribs.

Client : Minami-Aizu Public Works Office

Design : Kyowa engineering Consultants Co., Ltd.

Construction : Joint Venture of Kawada Construction Co.,Ltd , Abe Nikko Kogyo Co.,Ltd and sanritsudoken Co.,Ltd.

Award for Outstanding Structures
- Buildings Category -

● Saito City Hall

(Journal of Prestressed Concrete Japan Vol. 65 No.4 2023; Cement & Concrete Monthly Japan November 2023)

Location : Saito City, Miyazaki Prefecture

Outline of Structure :

This building is a regional disaster prevention center with a base-isolated structure. To provide the office space with variable flexibility for future layout changes, a 13.6-meter column-free space was created using PC technology. The office space has a bare, straight ceiling made of DT slabs, and its shape is thoroughly utilized to integrate air-conditioning and lighting, resulting in a minimalist design with enhanced disaster-prevention functions. The roof of the top floor, which is also housed in the same span, is made of DT slabs of the same shape, so that all the panels are made of the same formwork, resulting in a lean design. The building is designed to have enhanced adaptability and extended social service life as a government facility, promoting environmental sustainability through increased longevity.

Client : Saito City
Design : Kume Sekkei Co.,Ltd.
Construction : Phase 1 Konoike Corporation, Yamato Kaihatsu, and Miyauchi Construction Specific Construction Joint Venture
Phase 2 Miyamoto Gumi Co, Sueyoshi Construction Co, Saito Ryokken Ltd, Kuroki Corporation, Nikko Denko Co.
Construction (PC) : Oriental Shiraishi Co.,Ltd.

● Hikone Sports Park Stadium (Heiwado HATO Stadium)

(Journal of Prestressed Concrete Japan Vol.65 No.4; Cement & Concrete No.915 May 2023)

Location : Hikone City, Shiga Prefecture

Outline of Structure :

The building, a replacement of the stadium that will serve as the main venue for the opening and closing ceremonies of the 2025 National Sports Festival and the National Sports Festival for People with a Disability, stands adjacent to the national treasure Hikone Castle. Once, a wooden bridge known as the "Hyakken Bridge" spanned this site. To inherit this historical memory and create a landscape of Japanese aesthetics centered around Hikone Castle, the new stadium employs a "Monomi-Yagura" structure resembling assembled wood with pairs of columns as its framework. This was achieved by adopting a precast prestressed concrete construction method, avoiding complex on-site construction and ensuring the construction of high-precision and high-quality structures.

Client : Shiga Prefecture
Design : AXS SATOW INC.
Construction : KAJIMA CORPORATION and SASAKAWAGUMI Co.,Ltd Joint Venture
Construction (PC) : P.S.Mitsubishi Construction Co.,Ltd

Award for Outstanding Structures
- Renovations Category -

● Deck Slab Renewal Work of Aguchi Bridge

(Journal of the 32nd Symposium on Developments in Prestressed Concrete)

Location : Maniwa City, Okayama Prefecture

Outline of Structure :

The Aguchi Bridge, spanning the Hokubo Dam between the Osa SA and Hokubo IC on the Chugoku Expressway, is a 110-meter-long three span continuous non-composite steel plate girder inverted Lohse bridge. Approximately 50 years have passed since its construction, and the existing deck slab has deteriorated over time; therefore, the deck slab has been replaced. There is a large difference in rigidity between the stiffening girders and longitudinal girders that support the deck slab, and there are concerns about cracks in the cast-in-place section because excessive additional bending moments are generated in both the axial and perpendicular directions of the bridge due to the unequal settlement of the deck-supporting girders. Therefore, a two-way PC deck slab structure that does not require a cast-in-place section was adopted to improve the quality. In addition, due to the requirement for a shortened construction period of about four weeks, a deck slab with an integrated parapet was adopted to expedite the construction.

Client : West Nippon Expressway Co., Ltd.
Design : Sumitomo Mitsui Construction Co., Ltd.
Construction : Joint Venture of Sumitomo Mitsui Construction Co., Ltd and Nishimatsu Construction Co., Ltd.

● Replacement of Deck Slab with Widening of Yatomi Viaduct, the Higashimeihan Expressway

(Journal of the 30th Symposium on Developments in Prestressed Concrete; Journal of the 31st Symposium on Developments in Prestressed Concrete; Bridge and Foundation Engineering, December 2023)

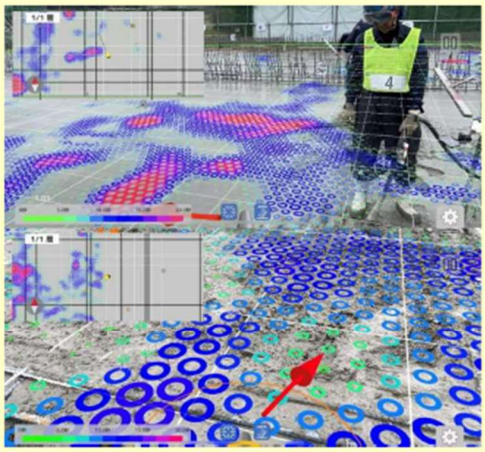
Location : Yatomi-city, Aichi-prefecture

Outline of Structure :

Yatomi Viaduct consists of 17 continuous three-span bridges with an approximate total length of 1.6 km. It was required to maintain one lane during deck replacement work, but due to the lack of existing deck width, the deck slab was widened by 1.42 m and replaced by dividing into two sections in the transverse direction. The existing bridge pier heads were also widened with precast concrete block and strengthened by external prestressing tendons. The Ultra High Strength Fiber Reinforced Concrete (UFC) was applied to deck joints for both longitudinal and transverse directions. In addition, to establish an effective logistics for construction materials without disrupting the existing traffic and significantly shorten the construction period, dedicated erection machines and lifting equipment were introduced in this project.

Client : Central Nippon Expressway Company Limited. Nagoya branch
Design : Joint Venture of Obayashi Corporation, Honma Corporation, and Kato Construction Company Limited.
Construction : Joint Venture of Obayashi Corporation, Honma Corporation, and Kato Construction Company Limited.

Award for Outstanding Engineering Innovations



● AR Management System for Concrete Compaction

(Journal of Prestressed Concrete, Japan Vol.65 No.3)

Location : Shimonoseki City, Yamaguchi Prefecture

Outline of Structure :

An innovative management method was developed that uses an augmented reality to visualize the compaction position and compaction time of multiple people in real time for concrete compaction work which has been previously done by human intuition. The compaction location is determined using the self-location technology of the smartphone attached to the vibrator, the compaction time is determined by measuring the drive current of the sensor-driven vibrator with a microcomputer, and construction information is superimposed and displayed on a tablet pc and smartphone. The construction manager can manage the construction information of multiple people all at once in real time, and compaction workers can perform appropriate compaction work regardless of their skill or experience.

Development : Oriental Shiraishi Corporation, Ltd.
iXs Co., Ltd.

● Development of Prestressed Laminated Timber Member

(Journal of Prestressed Concrete, Japan Vol.64 No.4)

Location : Takasaki-City, Gunma

Outline of Structure :

The aim of this development was to create long span beams with controlled deflection by applying prestressing to readily available and low-cost cedar laminated timber beams. Elemental experiments were carried out to confirm the bearing stress, creep coefficient, drying shrinkage and joint friction coefficient required to apply prestressing to laminated timber, then fracture and long-term loading tests were carried out on full-scale 15m beams. Laminated timber is easy to work with and can be easily joined to other structures by modifying the shape of the ends of the members and the joining hardware. It is expected that flexible and attractive architecture will be proposed using sustainable timber structures.

Development : College of Science and Technology Nihon University, FUKUI Tsuyoshi
MHS Planners, Architects & Engineers, MORITA Akira
Kenken Co., Ltd
TOJU Corporation

Award for Outstanding Accomplishments of Constructions

● Ikeshimagawa Bridge (inbound line) Slab Replacement

(Journal of Prestressed Concrete, Japan Vol.65 No.4)

Location : Ebino City, Miyazaki Prefecture

Outline of Structure :

Ikeshimagawa Bridge is 2+3 span continuous non-composite sheet girder bridge with a bridge length of 148m, located between Ebino JCT and Kobayashi IC on the Miyazaki Expressway. In this construction, the existing RC-slab, which had deteriorated for more than 45 years after completion, were replaced with precast PC-slab. For the slab replacement, a PC-slab with protrusion that uses tilted loop joints was adopted to improve productivity by saving labor in the construction of the filling part between precast concrete. The performance of the PC-slab joint was confirmed using a fatigue test with a running-wheel load, while the difference in load-bearing performance depending on the presence of protrusion in the PC-slab was confirmed by static loading tests.

Client : West Nippon Expressway. Co., Ltd.
Kyusyu Branch
Design : Fuji P.S. Co., Ltd.
Construction : Fuji P.S. Co., Ltd.

EVENTS

Annual Symposium
- The coming symposium -

The 34th Symposium on Developments in Prestressed Concrete

23rd - 24th October 2025

https://www.jpci.or.jp/eng-index.htm

The 34th Symposium on Developments in Prestressed Concrete will take place on October 23 and 24, 2025 in Fukui. The venue is Phoenix Plaza, Fukui Civic Welfare Hall. The objective of the symposium is to further develop prestressed concrete technology by sharing valuable knowledge obtained from research and practices. In the symposium, special lectures will be presented by two speakers, one from Japan and the other from overseas. We look forward to meeting you in the next symposium.

- The last symposium -

The last symposium, “the 33rd Symposium on Developments in Prestressed Concrete”, was held on 17th and 18th October 2024 at the Toki Messe, Niigata Convention Center, in Niigata. The purpose of the symposium is to attain further development of prestressed concrete technology by sharing valuable information among researchers.

During the symposium, the Workshop was held. Dr. Yasushi Tanaka, professor of the Kanazawa Institute of Technology, gave a keynote speech titled “Bridge damage caused by the 2024 Noto Peninsula earthquake and future challenges", and Dr. Toshiyuki Takahara, associate professor of the Kanazawa Institute of Technology, gave a keynote speech titled “Damage to geotechnical structures due to earthquakes in 2007 and 2024". Then, Dr. Tastuhiko Saeki,

Venue, Toki Messe

Opening ceremony

Prof. Yasuhiko Sato

Mr. Hideki Takebayashi

professor of the Niigata University, moderated an enthusiastic discussion with the participants.

In the Opening Ceremony Dr. Yasuhiko Sato, professor of the Waseda University, the chairman of the Executive Committee of the Symposium, gave an opening address. History and outline of the symposium were introduced. Dr. Takumi Shimomura, professor of the Nagaoka University of Technology, president of the JPCI gave an opening speech. Then, Mr. Hideki Takebayashi, a manager of the Road Department of the Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism gave a speech of greeting.

Dr. Yasuyuki Kishi, Associate Professor of the Niigata University and Dr. Seung-Kyoung Lee, SK Lee & Associates, Inc., were invited and gave special lectures.

Dr. Yasuyuki Kishi presented “A world first: Niigata University's challenge to Sake-study, Sakeology”. On May 9, 2017, Niigata University concluded a collaboration agreement with Niigata Prefecture, the Niigata Sake Brewers Association, and Niigata University to establish "Sakeology," a broad academic field that encompasses both the cultural and scientific aspects of sake, with the aim of contributing to the formation and development of an international base for the study of sake. Based on this agreement, the Niigata University Sakeology Center was opened as a university-wide organization on April 1, 2018. Initially a group of volunteer researchers, in January 2020 it was promoted to a university-wide joint education and research organization directly under the president, and made a new start as an official university-wide research and education center for "Sakeology." Turning our attention to the current state of the sake industry, consumption has been on a steady decline since peaking in 1973. Sake, which has been positioned as the national drink, is becoming more and more popular overseas, where it is called Sake, as the overseas market is expanding while domestic demand is shrinking. Although the export ratio of the sake industry as a whole is still low, sake exports are expanding, and the number of small sake breweries overseas is increasing year by year, so it is expected that demand overseas will expand in the future. In terms of international exchange, we have been actively promoting collaboration with overseas alcohol research institutes, and in 2019 we signed an inter-university exchange agreement with the University of Bordeaux in France, an international wine research center, and in 2020 with the University of California, Davis (UC Davis). We have already been jointly hosting a summer school on the theme of wine and sake with the University of Bordeaux for the past two years, and we plan to continue joint research in the future. Wine, which is brewed and enjoyed all over the world, has an established academic field called "oenology," which

Dr. Yasuyuki Kishi

Dr. Seung-Kyoung Lee and Prof. Takumi Shimomura

studies wine from a multifaceted perspective, centered on oenology and viticulture, and its existence has supported wine's global expansion. Now, "oenology" has become an academic field studied and studied at universities around the world, and has supported the development of the wine industry. The Sakeology Center will learn from the precedents of the University of Bordeaux and UC Davis, strengthen and expand industry-government-academia collaboration, and disseminate the fascinating academic field of sakeology, which is the first of its kind in the world, from Niigata University.

Dr. Seung-Kyoung Lee presented Corrosion of Post-Tensioned Tendons Filled with Cementitious Grout". The first study on grout in the United States was conducted by Cortest Columbus Technologies in 1991 with funding from the FHWA (Federal Highway Administration). Since then, at least 12 studies have been conducted by universities and related institutions on cement types, admixtures, premix materials, and material separation characteristics. In Florida, steel corrosion was discovered in several post-tensioned PC bridges by 2000. In response to this, in 2001, FDOT (Florida Department of Transportation) established standards for grout specifications to use premixed/non-bleeding materials, and other associations followed suit and revised their standards. However, steel corrosion occurred in PC bridges built after the standard revision, so in 2016, FDOT and VDOT (Virginia Department of Transportation) switched from cement-based grout to petroleum-based flexible filler. Grout defects can be physical or chemical. Physical defects include voids caused by bleeding or residual air in the duct that prevent the formation of a protective layer, poor hardening due to material segregation or a high water-cement ratio, and reduced compressive strength due to the porosity of the grout. Chemical defects include the inclusion of chloride ions, the generation of sulfate ions due to material separation, excessive bleeding water, and neutralization, which may reduce durability. Material separation in grout does not immediately induce corrosion of steel, and it can maintain its corrosion resistance under high pH conditions, but the durability of steel depends on chloride ions and sulfate ions. The four corrosion prevention methods used are: 1) EIT (Electrically Isolated Tendon system), 2) flexible filler such as petroleum wax, 3) stainless steel, hot-dip galvanizing, internally filled epoxy resin coating, and other anti-cast PC steel materials, and 4) impregnation methods. Over the past 20 years, grout materials, construction methods, and inspection techniques have made great advances, reducing the number of grout defects. As a result, the risk of corrosion of prestressing steel members has also decreased, and it can be said

Technical exhibition

Parallel session

that the durability of PC bridges constructed in recent years has improved compared to the past. However, deterioration and damage caused by corrosion of grouted PC steel members in PC bridges is expected to continue to surface in the future, so the prestressed concrete industry must continue to actively work on new ideas, technological innovation, and preventive maintenance in order to continue to improve durability.

In order to exchange information concerning activities, researches and original technologies 39 groups participated in the technical exhibition. Firms and organizations displayed their current information in the booths provided for the Technical Exhibition. Presentations were made by exhibitors and active discussions for each presentation were made in the exhibition hall.

In the last symposium, the total participants were 730. In the parallel sessions, 57 contributed papers and 120 reports were presented in 20 sessions. From each session, the most excellent presenters were chosen and were given “Award of Excellent Presentation”. Prize winners are as follows.

Session 1: *Yusuke Yoshitsugu*, Fuji P.S Corporation
Session 2: *Yusuke Kajino*, Graduate School, Waseda University
Session 3: *Keita Okamura*, Sumitomo Mitsui Construction Co., Ltd.
Session 4: *Tsuguhiro Kyutoku*, PS Construction Co., Ltd.
Session 5: *Fuminori Nakamura*, Nagaoka University of Technology

Award of excellent presentation

Session 6: *Tadaomi Takeyama*, Taisei Corporation
Session 7: *Yuu Ishii*, Kajima Corporation
Session 8: *Ryo Miyakoshi*, Nippon High Strength Concrete Co., Ltd.
Session 9: *Mayuna Shiraishi*, Oriental Shiraishi Corporation
Session 10: *Hayato Yamazaki*, Graduate School, Kansai University
Session 11: *Ryuji Naka*, Taisei Corporation
Session 12: *Ushi Kanou*, Nihon University
Session 13: *Yuka Nakano*, Sumitomo Mitsui Construction Co., Ltd.
Session 14: *Shyuichi Miyao*, Newtech Kowa Corporation
Session 15: *Makoto Nakamura*, Central Nippon Expressway Co., Ltd.
Session 16: *Takeshi Yamaguchi*, Central Nippon Expressway Co., Ltd.
Session 17: *Mitsuaki Noguchi*, PS Construction Co., Ltd.
Session 18: *Muro Tetsuyoshi*, Sumitomo Mitsui Construction Co., Ltd.
Session 19: *Yoshiko Amemiya*, PS Construction Co., Ltd.
Session 20: *Riku Matsumoto*, Graduate School, Yamaguchi University

Closing Ceremony, Executive Committee Members

■ 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: kaiinka-r5@jpci.or.jp

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