

# JPCI Award 2023

## 【JPCI Award for Outstanding Paper】

### ● Novel Evaluation Method for Grouting Condition of PC Duct by Using Wide-range Ultrasonic Testing

Isamu YOSHITAKE, Takanori KINOSHITA, Yoshino SAKO, Kuniharu FUKUSHIMA  
Journal of Prestressed Concrete, Japan, Vol. 65, No. 5

### ● Loading Test of Four Span Continuous PC box Girder Bridge Degraded by Salt Attack

Yasushi TANAKA, Shizuka TERAQ, Kiyotaka TOISHI  
The 32nd Symposium on Developments in PRESTRESSED CONCRETE

## 【JPCI 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** :

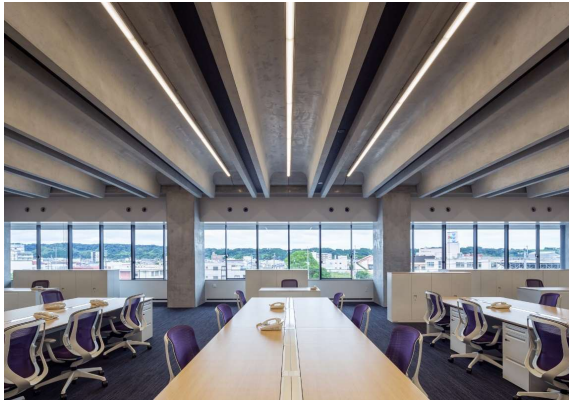
The Shimogo Bridge is constructed on the Onumazaki Bypass section of National Route 118, with a bridge length of 342.5 meters. It is an upper deck RC fixed arch bridge with an arch span length of 200.0 meters. This bridge ensures both a chromatic harmony with the evergreen and autumn foliage along the 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.

# JPCI Award 2023

## 【JPCI 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



# JPCI Award 2023

## 【JPCI 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

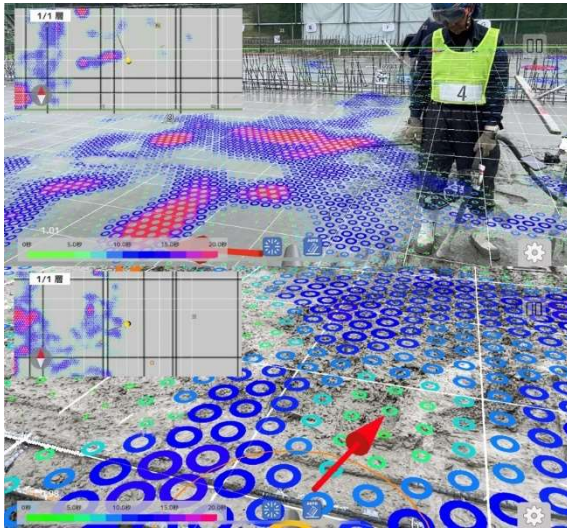
**Outline of Structure** :

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.

# JPCI Award 2023

## 【JPCI 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

## 【JPCI 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.