Annual Report

Department of

Architecrure and Building Engineering

Tokyo Metropolitan University

2016

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OVERVIEW OF RESEARCH ACTIVITIES

Architectural Planning / City Planning

Kenji TAKEMIYA

(1) Study on Care and Support Environment for Severe Disabilities
This study aims to clarify the characteristics and architectural planning of facilities for severely deformed child. This year some remarkable results were got as follows:
1) We made the survey of actual usage of the old facility for orthopedically-impaired children. And after transition to new system, we did the same survey of the new facility. We conducted observation survey of the old facility 4 times, each seasons, in 2015, and also did the survey of new facility 4 times in 2016. We made comparison of the results, we discussed the usability of the spatial configuration in the new facility.
2) We made the survey of day care facility for severely disabled children, and we discussed on the spatial configuration and facility management of day care facilities for children with severe disability who need medical care constantly.

(2) Residential care system and milieu for the elderly
This study aims at improving the quality of living environment for the elderly. This year, some remarkable results were got as follows:
1) The facility planning and management of small scale multifunctional care facilities.
2) Analysis of space utilization for terminal and bereavement care in nursing care facilities and rented accommodations.

(3) Study on the facility planning of hospitals
This study aims at improving the quality of the built environment in hospitals. This year, some remarkable results were got as follows:
1) Study on Regional Comprehensive Care Ward: We derived the knowledge of a new ward plan from the Survey of pioneering regional comprehensive care ward. 2) Study on design technique to cope with growth and a change of the hospital architecture: We carried out documents investigation and questionnaire investigation, and we extracted 17 technique to cope with growth and a change of the hospital architecture.
3) Study on the facility planning of hospitals for medical staffs: We carried out documents investigation, and we marshaled technique of amenity for staffs in hospital architecture.

(4) Study on facility planning for early childhood education
This study aims at improving the quality of the built environment in early childhood education facility. This year, some remarkable results were got as follows:
1) Study on facility planning of kindergarten: For two years, we have conducted actual usage survey of S kindergarten that have distinctive building and garden. We examined dissimilarity and commonality of the usage with time.
2) Study on the spatial composition and the status of its utilization at the nursery schools

or the certified Centers for early childhood education and care practicing multi-age groupings: We carried out hearing survey about 4 facilities practicing multi-age groupings education. And we have conducted actual usage survey of the certified centers for early childhood education and care that have distinctive building.

These studies are to be published in Summaries of Technical Papers of Annual Meeting, A.I.J.

Tohru YOSHIKWA

Theoretical Study on Compactness of Cities
Tohru YOSHIKAWA
In Japan, urban policies for compact cities are being conducted considering the decrease in population, the lower birth rates, the aging society and the serious global environmental issues. Considering this situation, the study explored what is the compactness of cities. During this year, the optimal urban form of a linear city with hierarchical bases structure assuming the existence of multiple floors minimizing the average travel time to the center was analyzed.

Development of the evaluation method for the existing building stock on the basis of location
Tohru YOSHIKAWA
It is the problem important to our country, which is leaving for the low birthrate and aging society, to utilize a large quantity of buildings accumulated after the war as effective social property. To this end, methods easy to use for evaluating the existing building stock easily would be effective. Therefore, this study aimed at the development of the method to evaluate existing stock buildings based on the location. In this year, the characteristics of consumer surplus and numbers of visitors as evaluation indexes of social benefit for facilities with distance decay of utilization ratio were analyzed using simulation.

Motoki TORIUMI

Masumi MATSUMOTO

Studies on Sustainable Living of Elderly People in their Local Communities
Masumi MATSUMOTO
This series of studies aims to research on the living environment of elderly people who continue to live in the same community, and to research and develop supporting systems for such people.

1) Research using sensors to monitor elderly people's behaviors in their homes.
2) Research on community salons and support for senior citizen.
3) Research on various community activities for elderly people and their relationship with the professionals working in community comprehensive care centers.

Studies on Regeneration and Revitalization of New Towns
Masumi MATSUMOTO
Tama New Town is the largest new town developed over 40 years ago in Japan. This series of studies aims to research and develop the methods for regeneration and revitalization of living environment of new towns, mainly exemplified by Tama New Town.
1) Research on housing conditions and lifestyles in Ochiai – Tsurumaki District of Tama New Town.
2) Research on neighboring commercial areas of Tama New Town.
3) Studies on governing body of an old condominium apartment.
4) Studies on community activities initiated by women residing in Tama New Town.

Studies on the Positioning of Interior Design in Housing Design Processes
Masumi MATSUMOTO
Conducted hearings to architects on the design making processes relating to housing designs.

Ryo SANUKI

Study on travel cost method focusing on the location normalization plan
Ryo Sanuki, Shin Aiba

Planning method of location normalization plan
Shin Aiba, Chie Nozawa, Masahiko Nakanishi, Ryo Sanuki

Study of pre-disaster planning for post-disaster recovery targeted non-building-crowded area around Tokyo suburb
Taro Ichiko, Ryo Sanuki, Jin Yoshikawa, Itsuki Nakabayashi

Study on the revitalization of historical building in Taipei city
Ryo Sanuki, Hsiao Hong-Wei, Sangjun Yi, Makoto Tsunoda, Tohru Yoshikawa

A series of studies on practice of public facility management
Hiroki Tsutsumi, Ryo Sanuki, Yukio Komatsu

Consideration of Expanded Placement of School Children's Day Care Center Utilizing Regional Resources for Securement Enough Capacity
Asuka Yamada, Ryo Sanuki

Architectural Design and History

Masao KOIZUMI

Katsuhiro KOBAYASHI and Akira KINOSHITA

Analyses on Composition of Modern and Contemporary Architecture
Katsuhiro KOBAYASHI, Akira KINOSHITA
One of the main purposes of architectural design research is to clarify morphological principles that give birth to architectural beauty. For this purpose, it is important and effective to abstract compositional principles and compositional methods from existing architectural works and to examine the design principles. In the academic year of 2016, designs of resent high-rise buildings, works of Luis I. Kahn, Mart Stam were analyzed. Research on resent high-rise buildings was published as a book titled “Skyscrapers-Challenges of High-rise Buildings in the World” in Aug. 2015.

Development of Architectural Design Method
Katsuhiro KOBAYASHI, Akira KINOSHITA
In architectural design research, it is also important to apply design principles and compositional methods abstracted by analyses to actual architectural design works. Thereby theory and practice, in other words, basic research and high-level application would be synthesized. In the academic year of 2016, relations between theory and design practice were pursued through three design works of our master program students.

Research on Design of Architectural Conversion
Katsuhiro KOBAYASHI, Akira KINOSHITA
It is becoming one of the crucial social subjects in the architectural field of Japan to find out various methods to revitalize the existing building stocks. Among these methods, architectural conversion is very useful and important. For more than 10 years, we have made research survey on architectural conversion abroad. In the academic year of 2016, we published research results of the previous year in Summaries of Technical Papers of Annual Meeting, A.I.J. and made investigations on converted buildings in Australia (Sydney, Melbourne, Brisbane) and New Zealand (Wellington, Auckland) for two weeks, from Sept to Oct. We went to cities in Far East, Siberia and Moscow for ten days, in the end of Sept.).

Study on Landscape Architecture and City in Early Modern Period
Akira KINOSHITA
The perception of landscape or scenery is recognized as more important factor in the phase of urban development today. Whereas to perceive the design of architecture with the relation to its surrounding environment is more valued than the physical features of the building. Those perceptions on natural or rural scenery and landscape are expressed

not only in gardening but also in the town planning in colonial cities. It is recognized that the brio of those concepts exists in rebuilding plan for the London City after the Great Fire drawn by John Evelyn, Robert Hooke and Christopher Wren. In this research, I examined the case of Wellington, the capital city of New Zealand, where the concept of 18th century idea of landscape is partially realized, by pursuing field work the city in October.

Yukimasa YAMADA

Studies on the Architectural History of Catholic Churches in the Northern Vietnam
Yukimasa YAMADA

Christianity in Vietnam, since its introduction early in the sixteenth century, has been evolving and expanding to an indigenous culture among the society, convention and thoughts different from European countries. We are focusing attention on three Catholic dioceses that have been played most important rolls in the history and culture of Christianity in the Northern Vietnam, Bui-Chu diocese, Thai-Binh diocese and Phat-Diem diocese. Collaborating with the liaison section of each diocese, we attempt to conduct surveys and analysis of existing historical churches, supported by JSPS KAKENHI Grand-in-Aid for Scientific Research (A). In this fiscal year, we discussed their architectural characteristics of the churches in Phat-Diem diocese, based on the field survey in August 2015, and we submitted some papers to the annual meeting 2016 of A.I.J.

Studies on Conservation and Utilization of Historical Buildings in Japan
Yukimasa YAMADA

The trends in conservation and utilization of historical buildings under the law for the protection of cultural properties are changing recently with establishing the registration system for cultural properties in 1996 and the landscape law in 2004. In this fiscal year, based upon a nationwide questionnaire survey, selecting some local cities, we tried to make an analysis on the actual situation of activating the registered cultural properties, and we reported it at the annual meeting 2016 of A.I.J.

Studies on Historic Architecture and Urbanism in the Islamic World
Yukimasa YAMADA

Although numbers of the historic architecture in the Islamic world have their own peculiar features in the architectural techniques and designs, their nature has not yet been understood adequately in Japan, nor has their urbanism as their agglomeration. In this fiscal year, based upon the surveys and literature reference, we discussed the historical background and changes regarding mosques management system in China, in a series of our successive studies on the architectural history and urbanism in Islam, and we submitted a paper to the International Conference ISAIA 2016.

Jun INOKUMA

Construction Management and Building Materials

Yoshinori KITSUTAKA and Yoichiro KUNIEDA

Self-Healing Performance of Heavyweight Concrete with Steam Curing
KITSUTAKA

The crack self-healing performance of the heavyweight concrete used in the walls of containers and structures designed to shield radioactive materials was investigated. A steam curing temperature that preserves self-healing properties and demolding strength was identified. Proposed simultaneously mixing method using the expanding material and the fly ash in the process of admixture can maximize self-curing performance. Also adding synthetic fibers in the heavyweight concrete improved self-healing performance.

Pull-out Behavior of Mechanical Anchor Bolts by Cyclic Loading
Yoshinori KITSUTAKA and Yoichiro KUNIEDA

Pull-out properties of various mechanical anchor bolts embedded in concrete were investigated. Five kinds of mechanical anchor bolts were selected which were ordinary used for concrete anchoring. Tensile tests for mechanical anchor bolts embedded in φ300mm x 100mm size concrete were conducted to measure the load - load displacement curves. The loading conditions were a monotonous loading and a repeating loading. The fracture energy for each mechanical anchor bolts were estimated by the analysis of consumed energy calculated by the load - load displacement curve. The effect of the types of mechanical anchor bolts on the pull-out properties of concrete subjected in a monotonous loading and a repeating loading was cleared.

Studies of the mechanical characteristics of Accelerated Carbonation ALC (Autoclaved Lightweight aerated Concrete) under a high temperature condition
Yoshinori KITSUTAKA and Yoichiro KUNIEDA

The ALC (Autoclaved Lightweight aerated Concrete) is broadly applied to constructions especially for the steel buildings due to its properties; lightness, thermal insulation, fire resistance and workability. Carbonation of ALC was investigated the significance of the influence on the fire resistance in experiments as the main factor of durability. Attachment of a furnace to the compression testing machine allowed the compression test under high temperature. The compression strength and the modulus of elasticity were increased as temperature was raised between 200 to 500 degree. Considering the water content, the compression strength could be calculated with a suggested formula. In addition, the influence of carbonation on the ALC was found to decline the compression strength and the elasticity, which would be more significant with high temperature.

An attempt to reduce color differences of external tiles by optimized tile selection
Yoichiro KUNIEDA and Yoshinori KITSUTAKA

The color gap between new and old external tiles in the building repair may induce complaints from clients. As the solution, the Hangarian Algorithm, an optimization technique, was adopted to the tile allocation according to the color values of repair and

replaced tiles. A large improvement of color gap at the tile allocation was validated through the model simulation even with the repairmen tiles having wide color distribution. Despite this, the improvement would not be efficient when the original color gap between tiles were too significant.

Makoto TSUNODA

Studies on Activation Technique of Public Building Stock
Makoto TSUNODA
In Japan, demolition and new construction based on declining in the durability and increased availability of buildings continues to be practiced. This practice is unfavorable from the viewpoint of utilization of the existing building stock. Activation technique is necessary for leading preservation and improvement of the public property.
In this year, we clarified the actual conditions of rebuilding, remove, reconstruction and renovation to the existing building.

Organization of Subcontractor for Stock Housing
Makoto TSUNODA
Contents of improvement, such as reform, were diversified in requirement of residents. Therefore, the details of construction and its cost were complicated. As regards realization stock-based societies, the productive organization of effective utilization for stock housing, especially contribute to residential requirement were in urgent need. And it was necessary to creating the local housing construction network owing to sustainable improvement.
In this year, from analysis of the connecting of processes to improvement of expected problems, we arranged ideal management technique peculiar to repair work systematically.

Research on How to Configure the Renovation Construction Methods Corresponding to the Building Stock
Makoto TSUNODA
Although we were supported by using the formulas of the various construction system for performance was required in new construction, there is a completely different conditions in terms of new construction and renovation that are present in a pre-existing condition. And that the work of the components to the contents of the construction methods in new construction is not seen to reflect. Therefore, there is some relationship between the role of members in the construction methods and improved performance as a result of each repair. In the renovation, it is considered that the contents of the construction system are particularly reflected in the constituent members to direct.
In this year, we made the platform which contributed to development of new construction methods of renovation and explanation of the repair principle.

Studies on methodology of the building improvement to be compatible with value of property and utility.

Makoto TSUNODA

It is not unusual for an available building to be removed for some reason. As a removal reason, completion original performance cannot maintain and use of building changes. There are various things in reproduction technique to resolve these situations. So far to improve the property values when we extend the life of an existing building, maintenance and improvement of various performances and addition of the new performance that does not hold it are required. Similarly, to improve the utility value, physical changes of the building it and the function changes such as the usage of building are required. These two value improvement does not become independent each, and renovation program of the building should be drafted after having considered the trade-off of both. Various renovation techniques are seen in today, but the technique that included plural value improvement to advance building renovation of building are the urgent need.

The result of this year is as follows.

From field survey of the demolition works with the renovation, we clarified the actual condition of construction and showed the prior examination item which was useful for reduction in labor for demolition. In addition, the partial demolition were effective for reduction in labor and we clarified prior examination items of partial demolishing and made demolition work flow.

Tomoyuki GONDO

Conventional House Production System in Asian Countries

Hirotake Kanisawa, Tomoyuki Gondo, Kazuya Shide

In South-East Asian country, we expect active house production. In Vietnam, from the interviews with several architects, construction teams, building parts suppliers, we made clear the building system of conventional RC and brick construction. In Thailand, we focused on the increase of high rise condominiums, and investigated the maintenance system of them.

Lack of Skilled Workers and Necessity of Industrialization

Shuichi Matsumura, Hirotake Kanisawa, Tomoyuki Gondo

To deal with the lack of skilled workers, we record several problems in construction site of an industrialized house builder, and propose some improvement plan. In particular, we focus on the management of workers utilizing ICT technologies.

Structural Engineering

Kazuhiro KITAYAMA

1. Seismic Performance and Different Limit States for Beams in Precast Prestressed Reinforced Concrete Frame Assembled by Post-Tensioning Unbonded Tendons
KITAYAMA Kazuhiro and JIN Kiwoong
A final objective of this study is to propose an easy and explicit method which can evaluate both strength and deformation capacity at different limit states such as an elastic limit, yield and ultimate point for beams in a precast prestressed concrete frame assembled by post-tensioning unbonded tendons (called unbonded PCaPC), eventually aiming to establish a performance-based seismic design methodology for unbonded PCaPC buildings. In the study, unbonded PCaPC cruciform beam-column subassemblages, which were designed to develop beam flexural yielding, were tested under cyclic load reversals in 2015 to investigate seismic performance and different limit states for unbonded PCaPC beams. A ratio of total tensile force induced to post-tensioning unbonded tendons to the product of a beam sectional area and concrete compressive strength (called a PC-steel ratio) was varied in the test.

Two plane specimens and a 3D specimen with slabs and no-loaded transverse beams were tested. A PC-steel ratio of beams was 0.09 and 0.17 for two plane specimens, and 0.09 for the 3D specimen. A column-to-beam capacity ratio of 2.3 and 2.6 was set by adjusting the amount of column longitudinal reinforcement respectively for plane specimens, and 1.9 for the 3D specimen. This was intended to prevent joint-hinging failure of a beam-column joint panel. All specimens failed in concrete crushing at beam ends. Following findings were obtained from the study.
(1) Strain of post-tensioning unbonded tendons reached elastic limitation of the tendon at an early loading stage for a plane specimen with a PC-steel ratio of 0.09. In contrast, strain of tendons reached elastic limitation after crushing of shell concrete in beams for a plane specimen with a PC-steel ratio of 0.17, resulting in more severe damage in beams. A ratio of beam residual deflection at unloading to peak deflection (called a residual deflection ratio) was approximately 0.1 for a beam with a PC-steel ratio of 0.09, which was twice that for a beam with a PC-steel ratio of 0.17.
(2) Under top tension of a T-shaped beam with slabs, a residual deflection ratio, a residual opening width of separation of a beam from a beam-column contacting interface and an equivalent viscous damping ratio were twice or more as large as those under bottom tension because of slab bar yielding and severe concrete damage at a beam bottom section.
(3) Reaching the stress of 0.9 times the concrete compressive strength at an extreme compression fiber of a beam section determined the serviceable limit for all beams regardless of a value of a PC-steel ratio and an existence or none of slabs. A beam deflection angle at the serviceable limit ranged from 0.12 % to 0.37 %, which seemed to be a little small, however almost corresponded to a stiffness declining point on the skeleton curve in force-deflection relationship for the beam.
(4) The first restorable limit was attained due to an elastic limitation of post-tensioning unbonded tendons at a beam deflection angle of 0.7 % approximately for a rectangular

beam with a small PC-steel ratio. The safety limit state for a T-shaped beam under top tension was attained due to bottom concrete crushing at a beam end or rupture of slab bars at a beam deflection angle of 2.8 %.

2. Evaluation of Ultimate Flexural Strength and Deformation for Beams in Precast Prestressed Concrete Exterior Beam-Column Unit Frame Assembled by Post-Tensioning Unbonded Tendons

KITAYAMA Kazuhiro and JIN Kiwoong

A moment-resisting frame, which consists of precast concrete column and beam members assembled by post-tensioning unbonded tendons, is called an unbonded PCaPC structure. As a necessity, this structure is designed by the strong column-weak beam mechanism against an earthquake, so appropriate estimation for the beam flexural strength and deflection is very significant.

Among such beam flexural strength and deflection, the ultimate flexural strength and deflection of the beam, as well as those strength and deflection when the tendon strain reaches a particular value such as its elastic-limit state, will be of great concern in the structural design. A macro-model, which can reproduce the flexural behavior of the cruciform unbonded PCaPC subassemblage, was proposed by Song Sunghoon in 2016 to evaluate the ultimate flexural strength and deflection of the beam, whose unbonded tendons are placed symmetrically at the top and the bottom in the beam section.

In this study, a simplified evaluation model, which faithfully reflects the seismic behavior of an unbonded PCaPC exterior beam-column subassemblage, with different tendon forces of the beam on the compressive and the tensile side, and valid evaluation methods for those beam flexural strength and deflection are proposed, based on a same theoretical approach as the macro-model above-mentioned.

In the proposed model, when a lateral force acts to the frame, the beam with post-tensioning unbonded tendons rotate as a rigid body with a main crack opening at the beam-column interface, and the plane section is assumed at the interface. Also, the compatibility condition in the axial deformation between the beam and the tendon, as well as the force equilibrium between the concrete and the tendon, were applied to derive the evaluation methods.

The estimated beam flexural strength and deflection were then compared with authors' previous tests. Evaluated ultimate flexural strength and deflection of the beam also showed reasonable agreement with the tests. The beam flexural strength from the test results was found to be 0.95 to 1.0 times the computed strength, and that of the beam deflection ranged from 81% to 107% of the calculation results.

3. Earthquake Resistant Performance for Precast Prestressed Concrete Exterior Beam-Column Unit Frame Assembled by Post-Tensioning Unbonded Tendons

KITAYAMA Kazuhiro and JIN Kiwoong

A beam-column joint hinging failure, which is a new failure mechanism proposed by Dr. Shiohara, has been broadly known for reinforced concrete (R/C) moment-resisting frames when an ultimate flexural capacity of a column section is close to that of a beam section in a R/C frame at the center of a beam-column joint. Consideration to the joint hinging failure was introduced in Standard for Lateral Load-carrying Capacity

Calculation of R/C Structures (Draft) published by Architectural Institute of Japan in 2016. In contrast, for moment-resisting frames which consist of precast concrete beams and columns connected by post-tensioning unbonded tendons (called as unbonded PCaPC frames), the joint hinging failure is little verified through laboratory tests.

Suzuki, Song, Jin and Kitayama (2015 and 2016) conducted loading tests to unbonded PCaPC cruciform beam-column subassemblages, and indicated the following; although a column-to-beam ultimate flexural capacity ratio was 1.2 for a cruciform subassemblage specimen with slabs alone, the specimen did not fail in joint hinging but beam flexure due to concrete crushing at beam ends. In contrast, a joint panel rotation increased after peak lateral capacity and symptoms of the joint hinging failure were observed. Damage to a beam-column joint in a 3D subassemblage specimen with transverse beams and slabs was, however, mitigated due to transverse beams and slabs covering a joint panel surface, showing beam flexural failure in spite of a column-to-beam ultimate flexural capacity ratio of 1.2.

Therefore, in order to study on the joint hinging failure in unbonded PCaPC frames, two exterior beam-column subassemblage specimens were tested under cyclic load reversals. Specimens were designed to form the joint hinging mechanism on the basis of a simplified calculation proposed by Dr. Shiohara in 2014, which can predict the joint hinging ultimate capacity of an R/C beam-column joint. One plane specimen and one specimen with slabs alone had a column-to-beam ultimate flexural capacity ratio of 1.09 and 1.05 under top tension for a T-shaped beam, respectively. Column axial load of 440 kN (axial stress ratio of 0.04) was common. A joint shear capacity margin was 1.8 for the plane specimen and 1.5 under top tension for the specimen with slabs.

Diagonal cracks occurred in a beam-column joint panel for both specimens. Column longitudinal bars and joint lateral hoops yielded, and then both specimens attained to the maximum lateral capacity at a story drift angle of approximately 2 %. Thereafter, lateral load-carrying capacity descended gradually. Strain in unbonded tendons exceeded a little elastic limitation, but unbonded tendons did not yield.

Concrete at both a beam end and a lower column spalled off for the plane specimen without slabs. Damage to a beam-column joint panel was also remarkable. Column longitudinal bars buckled in a joint panel under cyclic loading at a story drift angle of 4 %, resulted in an increase in a lower column deflection.

Damage to the beam end was slight for the specimen with slabs though flexural cracks developed in slabs. Column longitudinal bars buckled in a joint panel under cyclic loading at a story drift angle of 4 %, accompanied with spalling-off of shell concrete in a wide area of both a joint panel and a lower column. In contrast, top surface of slabs and a upper column suffered little damage. Spalling-off of shell concrete did not occur and a width of a few diagonal cracks was very narrow in an upper one-third area within a beam-column joint panel. This seems to be caused by confining effect due to slabs.

4. Evolution of Reinforced Concrete Structural Wall

KITAYAMA Kazuhiro

Reinforced concrete (R/C) walls in a building are very effective as a lateral load-carrying element on resisting earthquake excitations since R/C walls have larger stiffness and capacity to horizontal load than R/C usual columns. This fact is quite

common for current structural designers for R/C buildings, however nobody knew about such effectiveness of R/C walls on earthquake resistant design only one hundred years ago, corresponding to the beginning of construction of R/C buildings in the world.

The first person who pointed out that R/C walls are useful to resist lateral load induced by earthquakes is Naito Tachu, a professor at Waseda University. He published a series of documents titled “Earthquake Resistant Design for Frame Buildings” from October 1922, just before Kanto Earthquake in September 1923. He used first the term “bracing wall” as a primary lateral load resisting element in the document. Naito Tachu advocated that R/C walls installed in a beam-column frame contribute to resist lateral load induced by wind and earthquake motions because R/C walls enhance lateral load capacity and reduce a lateral deformation of the building.

He indicated also that R/C structural walls should be placed at a scattering position in a plan to avoid a concentration of lateral load. His concept that a vertical continuation of walls and a placement of walls with good balance in a plan are important is just a key point for current earthquake resistant design for buildings.

Naito Tachu conducted structural design of Nippon Kogyo Bank Building constructed in May 1923, in which he used R/C structural walls actually. The building was designed according to a base shear coefficient of 0.067. The building suffered only slight damage such as cracks in walls and spalling-off of some tiles by Kanto Earthquake in September 1923. This showed that R/C structural walls are able to enhance earthquake resistant performance of buildings.

Reconnaissance reports on buildings damaged by Kanto Earthquake written by Naito in 1925 and Nagata in 1927 indicated that many R/C buildings suffered major damage because structural walls were not placed appropriately for those buildings. Note that Naito and Nagata had taken proper recognition that only bare R/C frames are insufficient to resist earthquake motions, however installation of R/C structural walls to beam-column frames can enhance seismic performance for the building.

Jiro TAKAGI

Toshikazu KABEYASAWA

An experimental study on the damming effect caused by the waterborne debris
Toshikazu Kabeyasawa
The hydrodynamic test has been conducted at the large-scale flume in CRIEPI, and examine the increment of the wave load due to the damming caused by the waterborne debris. The test specimen is one-tenth scale four story reinforced concrete moment resisting frame, and the debris model is a timber box frame settled in front of the specimen, regarded as a two-story wooden house. The specimen survived without debris under sequential bore, while the specimen collapsed with debris model due to the increment of wave load by the damming effect.

A study on the dynamic response of reinforced concrete structures under impulsive surge front forces
Toshikazu Kabeyasawa
The simple SDOF analysis is carried out in order to evaluate the dynamic response of reinforced concrete walls under the impulsive surge front forces and subsequent bore forces in past-hydrodynamic test results. It shows similar maximum response drift in between the test and analysis. The impulsive surge front force does not affect the maximum drift of the specimen in the analysis because the time duration of the surge is very short.

A study on the relaxation length of slab reinforcement in the static loading test on the sub assemblage reinforced concrete frames
Toshikazu Kabeyasawa
FEM Analysis of sub assemblage reinforced concrete frame is carried out in order to evaluate the widening effect of T-shaped beam flange. The strain of slab reinforcement can be explained by the out-of-plane deformation of connected transverse beam. The equivalent relaxation length of slab reinforcement is almost same with the height of the longitudinal beams in past static loading test of the sub assemblage reinforced concrete frames.

Post-earthquake damage observation after 2016 Kumamoto Earthquake
Toshikazu Kabeyasawa
Post-earthquake damage observation is carried out after Kumamoto Earthquake 2016. The severe damages concentrated on buildings with the soft 1st story, eccentric floor plan, or surrounding ground damage. The connecting corridor shows severe damages in transverse direction among school building facilities due to ductile behavior of the moment resisting frames.

Noriko TAKIYAMA

Nonlinear Analysis of Japanese Traditional Wooden Frames with Fitting-Type Joint
Noriko TAKIYAMA
We research on the seismic performance of traditional wooden frames with large-section beams. First, based on past cyclic loading tests on four frames, a simple analysis model of a fitting-type joint was constructed using beam elements. Next, past experimental results were simulated by the model. Finally, a sensitivity analysis was performed to study about the effect of height arrangement of beams on the performance of the whole frame. The major findings of this study are as follows: (a) Some material tests are conducted for wooden test pieces cut down from all column of specimens. The compressive spring properties are decided. (b) Analysis models are constructed, and the restoring forces of frame specimens are simulated precisely. (c) The relation between height arranging beams and the change in restoring force is considered by

sensitivity analysis.

Performance Confirmation Test on Timber Column-Ground Sill Joint Reinforced by Improved Aramid Fiber Sheet
Noriko TAKIYAMA
High-performance aramid fiber sheets are a new class of composite materials made up of weaved polyamide fibers. In this study, the seismic performance and failure behavior of timber column–ground sill joints reinforced with aramid fiber sheets were investigated. In a past study, we conducted bending tests under cyclic loading for three column–ground sill specimens. After reinforcing the specimens with aramid fiber sheets, the joint strength improved but was dependent on the method of attaching the sheet. It was found that the compression zone of the aramid fiber-reinforced plastic layer broke at the joint boundary. In this paper, we proposed an improvement in the method of attaching the fiber sheet to the joint. On the compression zone at the boundary of the joint, resin was not pasted onto the aramid fiber, the fiber was not cured, and the plastic layer was not formed. Therefore, we could solve some problems and control the failure of column-ground sill joints.

Present State Analysis and Evaluating Vibrational Properties of Early Showa Period Billboard Architecture for Renovating Facilities in Densely Built-up Wooden House Areas
Noriko TAKIYAMA, Ryo SANUKI, Masumi MATSUMOTO, Tomoyuki GONDO and Shigeru AOKI
We research on buildings and their surroundings for disaster prevention in Chuo-3, Ota City, one of the areas in Tokyo, Japan that is Densely Built-up Wooden House Areas in Tokyo, Japan. We conducted an exhaustive survey of 809 buildings and roads in the northwest area of Chuo-3. As a result, we found evidence of early Showa period billboard architecture. We subsequently measured the dimensions of the billboard architecture and surveyed the materials of the walls, roofs, windows, etc. Furthermore, we constructed a standard billboard architectural model and conducted eigenvalue analysis to evaluate their respective vibrational properties, such as the natural frequency and vibrational mode.

Kazushige YAMAMURA

Environmental Engineering

Nobuyuki SUNAGA

Research on Comfortable Bioclimatic Architecture
For the benefit of preserving global environment, the effective use of energy consumed in architecture and the utilization of natural energy are indispensable factors for architectural design. Furthermore to popularize Zero Energy Building and Bioclimatic Architecture (BA) which is designed by considering energy conservation, natural energy utilization and comfortable environment, it is necessary to clarify the actual performance of BA and to establish evaluation methods which are simple and widely acceptable for the public. We have been engaged in the research of these themes, and, in recent years, we give high priority to improve building stocks.
In this academic year (2016/04 – 2017/03), we mainly carried out following studies and activities.

1. Long-life, Environmental Friendly House by Tokyo Metropolitan Government [Collaboration with Assistant Professor Eiko Kumakura and Research Fellow Hiroko Onodera]
At the request of Tokyo Metropolitan Government, we have studied about the performance of 16 detached houses which have high thermal performance, a solar floor heating and hot water system and HEMS from 2013. And also we examined the outside thermal environment in this site which has much green and a soil pass way in the center. In this academic year we integrated the results of this research to a report. One of the main conclusion is the carbon dioxide emission of these houses is about 25 % of the ordinary houses by considering the sold electricity of solar power generation. And we mentioned about the strategies for ZEH (Zero Energy House), like as the necessity of annual use of solar hot water system, further improvement of thermal insulation and solar shading, much more energy-saving action by residents and so on.

2. Relationship between Thermal Insulation Performance and Life Quality
When the thermal insulation performance of residence leaps to the highest level, it is considered the comfortableness of residents is improved and the residents' behavior and awareness will be changed. This research examines the effect of high level thermal insulation by actual measurement, questionnaire survey and Web survey, collaborating with Asahi Kasei Construction Materials Corporation. In this academic year, we reveal that the kind of window, which normal residents can answer in questionnaire survey, is able to be used as the index of thermal insulation performance of residence and so on.

3. Improvement of Thermal Performance of Apartment House in Asia [Collaboration with Assistant Professor Eiko Kumakura]
We carried out the literature survey about the thermal performance of apartment house and clarified that there are small number of study about it, especially in summer, in Japan and China. So we started the indoor climate measurement and the questionnaire survey for apartment house in Asia from 2014. In this academic year we surveyed at

Guangzhou city (in summer) in China, Harbin city (in winter) in China and Naha city (in summer) in Japan. Guangzhou is very hot and humid in summer and Harbin is severe cold in winter. Naha is in Okinawa prefecture and in Japanese climate zone XIII (in subtropics). Also we examined the difference of effect by several energy-saving methods in 5 climate zones in China by simulation using Energy-Plus, and the results of this study will be publish in AIJ transactions at April in 2017.

4. Cross-ventilation Effect of Lengthwise Alternately-Open Casement Window

We are studying about the cross-ventilation effect of a lengthwise outward window, developed by LIXIL Co., Ltd., that consists of the upper opening and the lower opening and each opening open to the opposite direction. It is shown this window has good cross-ventilation effect in the one-side opening room from experiments in 2014. In this year we carried out CFD analysis, using STREAM, about the difference of wind direction and so on. As the results, it is clarified the quantity of cross-ventilation in the wind-direction of 30° and 150° are the maximum and so on.

5. Improvement of Air-conditioning System of Art Museum's Repository

In this research we are examining the detailed distribution of thermal environment in the repository of K museum for the improvement of air-conditioning system, in cooperation with MAYEKAWA Associates, Architects & Engineers. It is required to keep constant temperature and humidity in the repository of museum, but it is difficult because there are many storage furniture and boxes of fine art which disturb the air movement by air-conditioner. In this year we carried out actual measurement and CFD analysis. On the basis of the measurement results, we studied some model of repository for CFD and we have a model which has good match with the measurement results. And now we are examining the detailed thermal environment after improvement.

6. Improvement of Thermal Environment at the Outside Space of Architecture and Urban Quarter [Collaboration with Assistant Professor Eiko Kumakura]

In this academic year, we studied about the thermal environment of Marathon course area at the 2020 Tokyo Olympics and the trends in awareness of an urban thermal environment based on tweets. About the former, we presented the results in last year and examined the calculation conditions for the program, Thermo-Render, which can calculate the surface temperatures of each parts in urban block. About the latter, we analyzed about 6,000 tweets in Tokyo city area, that include the words "hot" and "cool". From about 1,000 tweets with photo, it is shown the area of buildings in "hot" tweets' photo is triple larger than that of "cool" tweets' photo and so on.

7. Active Energy-Saving Control System for Air-conditioning Utilizing Adjustment Behavior of Occupants

We studied a new energy-saving control system for Air-conditioning. This system is able to install to the existing small and medium-sized building and to reduce the room conditioning deterioration by energy-saving action. This system is characterized by sensing occupants' on/off operation onto the air-conditioning. The results of this study was published in this academic year and we presented the marvelous performance of

this system and the necessity to control the all indoor units one by one.

8. Other outcome, social contribution and award
1) N. Sunaga is played as the vice-president of Japan Solar Energy Society and as a member of committee in AIJ and so on.
2) N. Sunaga is played as a member of some committees of Tokyo Metropolitan Government.
3) Three master course students, Mr. Keisuke Ogura, Miss Fu Nakajima and Rei Kuramochi, received Student Encouragement Prize of Japan Solar Energy Society.
4) The paper of a master course student, Mr. Koujiro Takeda, was selected for the Kanto Branch Selected Transaction of Architectural Institute of Japan.

Akihiro NAGATA

A Study on the Performance of Shut-Off of Heat and Air Flow of Air Curtain
Akihiro NAGATA

A Study on the Evaluation Method of Thermal Performance for Combination of Glazing and Shading Devices
Akihiro NAGATA

Masayuki ICHINOSE

1. Comissioning Study on Advanced Radiant Cooling System Assisted by Slight Air-Flow

2. Utilization of BIM for Facility Management of MEP

3. Effect of Window Renovation on IEQ and EUI of Existing Office Building

4. Relaxation Effect of Water Body on the Urban Outdoor Thermal Environment

5. Investigation Study on IEQ and EUI of Super High-Rise Office Building in the Tropics Asia

6. Investigation Study on IEQ of Urban Large-Scale Healthcare Facility in Bangkok, Thailand

Eiko KUMAKURA

「Developing a 3D model of tsunami-stricken villages in Japan」
Since 2013, we have conducted research to develop a 3D model of tsunami-stricken villages in the Tohoku region of Japan. This year, we commenced research on the fishing

village of Ryori in Iwate Prefecture, where we interviewed residents on three occasions and presented our model at an exhibition with another research group. From interviews, we gathered information about residents' memories of their work in the fisheries industry in Ryori. In future work, we plan to re-create the 3D model of their work zone in greater detail.

「Changes in residents' awareness of a shared garden path in a detached houses district」
Eiko Kumakura, Nobuyuki Sunaga
Since 2013, we have investigated the outdoor environment of the detached houses district in Fuchu. Using data from questionnaires, we compared residents' awareness and use of a shared garden path when they moved into the area and a year later. Among results, residents who came to appreciate the space provided by the path tended to notice tree growth and comfortable breezes in the morning and evening, even in midsummer, as reflected by open windows.

「Trends in awareness of an urban thermal environment during summer based on tweets and photos」
Eiko Kumakura and Nobuyuki Sunaga
To analyze metropolitan residents' awareness of the outdoor thermal environment, we used data from Twitter (i.e., tweets and photos) with location information, including keywords, related to thermal sensations. Among results, the number of hourly tweets about summer heat correlated well with the hourly outdoor air temperature during both weekdays and holidays. The numbers of tweets increased sharply when temperatures exceeded 30°C, and holidays had stronger correlations than weekdays. However, the number of tweets during weekdays more often related to residents' lifestyles, including commuting and eating time.

「Trends in greening subsidies in special wards of Tokyo」
Eiko Kumakura and Nobuyuki Sunaga
To investigate wall and rooftop greening subsidies in Tokyo, we conducted field and telephone interviews with local government representatives. Among our results, we found that only half of the total budget for greening subsidies in Tokyo was used during the last 5 years. Nevertheless, maintenance in greenery areas that received grants was of high quality, suggesting that residents who received grants were acutely eco-conscious. In all, residents need to know the benefits of greenery and greening subsidies toward improve their lives and communities.

Rumiko SASAKI

"Technology adoption on the building construction project in Asian tropical region"
Regarding the adoption of building environmental technology in the Asian tropical

region, this research investigated the decision-making process for designers, structural designers, technical consultants and constructors involved in large-scale construction project. By the cross-national comparison of Singapore, Vietnam, and Thailand, this research clarified the characteristics of the building construction process in respective nations with decision making factors and decision makers concerning technology selection. Furthermore, the prominence of the academician's role in technology diffusion was pointed out with case studies in Thailand and Indonesia.

LIST OF RESEARCH ACTIVITIES

Architectural Plannning / City Planning

Kenji TAKEMIYA

1. Refereed Papers

Sungryong KIM, Kenji TAKEMIYA, Shoko TAKAMITSU
Use of multifunctiona services and architectural space in a small-scale multifunctional long-term care facility for the elderly
Journal of Architecture and Planning (Transactions of AIJ), Vol. 81, No.730 , pp.2595-2604, 2016

Sungryong KIM, Kenji TAKEMIYA
Multifunctional services and space composition in small elderly care facilities - Analysis of pioneering care facilities in Japan (takurosho) -
Journal of the Korean institute of Rural Architecture, Vol.17,No.3, pp.9-16, 2016

2. Proceedings of Oral Presentations

FUJISHIMA Rika, TAKEMIYA Kenji
Study on the facility planning of Short-Stay care facility for people with severe disabilities
Summaries of technical papers of annual meeting E-1, AIJ, pp.29-30, 2016 (in Japanese)

FUJIWARA Yuki, TAKEMIYA Kenji
Current Situation of the Facilities for Physically disabled Children, Research on Facility Planning in the Medical Institution for Disabled children Part 1
Summaries of technical papers of annual meeting E-1, AIJ, pp.31-32, 2016 (in Japanese)

BAE MinJung, FUJIWARA Yuki, TAKEMIYA Kenji
Actural usage of the Facility K for Physically disabled Children, Research on Facility Planning in the Medical Institution for Disabled children Part 2
Summaries of technical papers of annual meeting E-1, AIJ, pp.33-34, 2016 (in Japanese)

NAGATA Eri, TAKEMIYA kenji
Study on the correspondence of the education policy to the architectual space and actual usage as the kindergarten, Case study of 4 facilities which have a characteristic kindergarten building and yard
Summaries of technical papers of annual meeting E-1, AIJ, pp.57-58, 2016 (in Japanese)

KAWATA Yuki, TAKEMIYA Kenji
The current condition of multifunctional long-term care in small facilities in the Tokyo metropolitan area
Summaries of technical papers of annual meeting E-1, AIJ, pp.257-258, 2016 (in Japanese)

KIM Sung-Ryong, TAKEMIYA Kenji
Analysis of actual usage of the multifunctional long-term care services and the architectural space in TAKUROUSHO Y for 20 years

Summaries of technical papers of annual meeting E-1, AIJ, pp.259-260, 2016 (in Japanese)
SUGINO Yuna, TAKEMIYA Kenji
Analysis of space utilization for terminal and bereavement care -Case study in nursing care facilities and rented accommodations-
Summaries of technical papers of annual meeting E-1, AIJ, pp.313-314, 2016 (in Japanese)
ReinaWATANABE, Kenji TAKEMIYA,Shigeki NAKAYAMA
Examination of Departmental Arrangement and Facilities in the Advanced Perinatal Center, Study on the Architectural Plan for Provision of Safety & High Quality Maternity Medical Treatment Part 3
Summaries of technical papers of annual meeting E-1, AIJ, pp.357-358, 2016 (in Japanese)
NAKAMA Takumi, TAKEMIYA Kenji, KOBAYASHI Kenichi, KOSUGE Ruka
Analysis of the situation in management and facility planning of community-based integrated wards
Summaries of technical papers of annual meeting E-1, AIJ, pp.389-390, 2016 (in Japanese)
KAMITOMO Yoki, TAKEMIYA Kenji KAKEHI Atsuo, OKAMOTO Kazuhiko
The Planning Method for Growth and Change in Hospital seen in Descriptions in Hospital Architecture Magazines
Summaries of technical papers of annual meeting E-1, AIJ, pp.393-394, 2016 (in Japanese)
ISHIBASHI Tatsuo, TAKEMIYA Kenji and KOBAYASHI Kenichi
A Study on the Management and Maintenance Activity Bases of Medical Electronics Departments in Acute Hospitals
Summaries of technical papers of annual meeting E-1, AIJ, pp.399-400, 2016 (in Japanese)

Tohru YOSHIKAWA

1. Refereed Articles
Takehiro KONDO and Tohru YOSHIKAWA, OPTIMAL URBAN FORMS OF LINEAR CITIES INCLUDING HIERARCHICAL SPATIAL STRUCTURE WITH CONSIDERATION OF FLOOR HEIGHT-Compared to the case withoutconsideration of floor height-, Journal of Architecture, Planning and Environmental Engineering (Transaction of Architectural Institute of Japan), Vol.82, No.733, pp.677-687, (Mar. 2017), (in Japanese)
LE Phong Nguyen and Tohru YOSHIKAWA, A METHOD FOR QUANTITATIVE EVALUATION OF URBAN PEDESTRIANS ACCESSIBILITY BY PUBLIC TRANSPORT, Journal of Architecture, Planning and Environmental Engineering (Transaction of Architectural Institute of Japan), Vol.81, No. 725, pp.1579-1588, (Jul. 2016), (in Japanese)

2. Proceedings of Oral Presentations

Tohru YOSHIKAWA, Comparison of the expected numbers of users and the consumer surplus as indexes for utilities of regional public facilities with distance decay of the utilization ratio, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.195-196, (Aug. 2016), (in Japanese)

Ginga TSUSHIMA, Tohru YOSHIKAWA and Ryo SANUKI, A Study on the Prosperity at the Central Districts of the Local Cities, Seen at the Viewpoint of the Distance from the Stations, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.205-206, (Aug. 2016), (in Japanese)

Takuro KOJO and Tohru YOSHIKAWA, Basic analysis of locations of bus stops considering the use of private cars in a liner city, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.207-208, (Aug. 2016), (in Japanese)

PHONG NGUYEN LE and Tohru YOSHIKAWA, Formulation for quantitative evaluation of urban pedestrians accessibility considering public transport, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.211-212, (Aug. 2016), (in Japanese)

Saki SUGINO, Tohru YOSHIKAWA and Ryo SANUKI, Time-series analysis on relationship between the image of towns by town guidebooks and the number of their visitors, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.239-240, (Aug. 2016), (in Japanese)

Hiroki WATANABE, Tohru YOSHIKAWA and Ryo SANUKI, About the influence of vastly in the city brought to people's sentiment -Taking the Waterfront Subcenter for instance-, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.241-242, (Aug. 2016), (in Japanese)

Takayuki ISOBE and Tohru YOSHIKAWA, Rating of appropriate placements of AEDs in large-scale high-rise urban facilities using three types of survival curves - Basic study on urban facilities for security and relief in cities, part 5, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.967-968, (Aug. 2016), (in Japanese)

Tetsushi SAKAMOTO, Takuro KOJO and Tohru YOSHIKAWA and Ryo SANUKI, Analysis of overlooking night views in terms of urban space structure -by focusing on streets and land use-, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp.1045-1046, (Aug. 2016), (in Japanese)

Tohru YOSHIKAWA, A Public Facility Location Planning Maximizing the Number of Visitors with a Visiting Probability Given by a Logistic Distribution, Informs 2016 International, SC16, 3, (Jun. 2016),

3. Others

3-2 Research Reports

Keisuke YASUTOME and Tohru YOSHIKAWA, A study on the factor for the cities where relocation or renovation can be easily conducted, Reports of the City Planning Institute of Japan, No.15, pp.101-106, (Aug. 2016), (in Japanese)

3-3 Manuals / Reviews

Tohru YOSHIKAWA, Enjoying Tama New Town doubly -on the Anti-formalist Rayok by Dmitri Shostakovich, Studies on Tama New Town, No.18, pp.156-157, (April. 2016), (in Japanese)

Motoki TORIUMI

Masumi MATSUMOTO

2. Proceedings of Oral Presentations
MATSUMOTO Masumi, Research of Change in Elderly People’s Behaviors in their homes by Using Motion Sensors, Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan, F-1, pp. 227-228, 2016.8.(in Japanese)
MOTEGI Yayoiko and MATSUMOTO Masumi, Suggestion and Decision Making Process of House Interior Elements by Architects, Summaries of the 28th Annual Conference of Japan Society for Interior Studies, pp.21-22, 2016.10. (in Japanese)

Ryo SANUKI

1. Refereed Papers
1) Sangjun YI, Ryo SANUKI : A Study on Investigation of the Public Facility Management Approach in Municipalities , 2016 International Conference on Architecture Engineering and Environmental Design, A2, pp.1-9, 2016.5
2) Kwanjong LEE, Makoto TSUNODA, Sangjun YI, Ryo SANUKI, Yuchia LAIO : Current Status of Evaluation of Existing Building Performance in Japan, 2016 International Conference on Architecture Engineering and Environmental Design, A3, pp.1-6, 2016.5
3) Ryo SANUKI, Sangjun YI, YuChia LIAO, Ching-Fang YU, Hong-Wei HSIAO, Shih-Hung YANG : Study on Policies and Actual Situation of Utilization of Public Facilities in Taipei Focusing on Old House Project, 2016 International Conference on Architecture Engineering and Environmental Design, A4, pp.1-6, 2016.5
4) Ryo SANUKI, Hiroki TSUTSUMI : Study on Relationship between Two Numbers of Total Amount of Public Facilities by Difference of Level of Administrative Unit - Comparison between Prefectures and Municipalities in Japanand Environmental Design, 2016 International Conference on Architecture Engineering and Environmental Design, A5, pp.1-8, 2016.5
5) Ryo SANUKI, Shih-Hung YANG, Hong-Wei HSIAO, Ching-Fang YU, Sangjun YI, YuChia LIAO : Study on Locational Tendency of Public Facilities in Taipei and Detailed Analysis of Old House Project, Papers on Property Management, Taiwan Institute of Property Management, A3, pp.1-6, 2016.6
6) Xueqi Cui, Yuchia Liao, Makoto Tsunoda, Sangjun YI, Ryo Sanuki : A Comparison Study in Repair Process of Communal Area in Residential Housing Between Japan and

China, ISAIA2016, D-15-5, pp.2276-2279, 2016.10
7) Kwanjong LEE, Makoto TSUNODA, Sangjun YI, Ryo SANUKI, Yuchia LIAO : Current Status of Existing Building Assessment(Inspection & Diagnosis) of Korea and Japan, ISAIA2016, C-3-7, pp.1431-1434, 2016.10
8) Taro ICHIKO, Ryo SANUKI, Jin YOSHIKAWA, Itsuki NAKABAYASHI : A Study of pre-disaster planning for post-disaster recovery targeted non-building-crowded area around Tokyo suburb : Ten years development in Hachioji, Tokyo, Papers on city planning, City Planning Institute of Japan, No.51-3, pp.415-422, 2016.11 (in Japanese)
9) Asuka YAMADA, Ryo SANUKI : Consideration of Expanded Placement of School Children's Day Care Center Utilizing Regional Resources for Securement Enough Capacity : Case Study at Three Wards in Tokyo, Papers on city planning, City Planning Institute of Japan, No.51-3, pp.881-887, 2016.11 (in Japanese)

2. Proceedings of Oral Presentations
1) Shin AIBA、Chie NOZAWA, Masahiko NAKANISHI, Ryo SANUKI, Misato INABA, Riki SUNAGA : Planning method of Location Normalization Plan, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.49-52, 2016.8 (in Japanese)
2) Ryo SANUKI, Takuro KOJO、Shin AIBA : Study on Location of Regional Cores Considering Accessibility to Regional Facilities : Case Study on Revision of City Master Plan in Local City, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.197-198, 2016.8 (in Japanese)
3) Ginga TSUSHIMA, Tohru YOSHIKAWA, Ryo SANUKI : A Study on the Prosperity at the Central Districts of the Local Cities, Seen at the Viewpoint of the Distance from the Stations, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.205-206, 2016.8 (in Japanese)
4) Saki SUGINO, Tohru YOSHIKAWA, Ryo SANUKI : Time-series analysis on relationship between the image of towns by town guidebooks and the number of their visitors, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.239-240, 2016.8 (in Japanese)
5) Hiroki WATANABE, Tohru YOSHIKAWA, Ryo SANUKI : About the influence of vastly in the city brought to people's sentiment : Taking the Waterfront Subcenter for instance, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.241-242, 2016.8 (in Japanese)
6) Kohei HARA, Ryo SANUKI, Masumi MATSUMOTO, Noriko TAKIYAMA, Tomoyuki GONDO, Shigeru AOKI : Seismic Performance Evaluation of Houses for Development of Regional Base in Chuo-3chome, Ota City, Tokyo : Part I: Complete Survey of Building and Analysis of Current Situation, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.969-970, 2016.8 (in Japanese)
7) Tetsushi SAKAMOTO, Tohru YOSHIKAWA, Ryo SANUKI : Analysis of overlooking night views in terms of urban space structure : by focusing on streets and land use, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.1045-1046, 2016.8 (in Japanese)
8) Kaoru AKIBA, Hiroki TSUTSUMI, Yuki MIZUIDE, Ryo SANUKI : Development Assessment of the Infrastructures by Population Density : A Study on the Evaluation

Method of Infrastructures in Public Facility Management Part.1 , Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.125-126, 2016.8 (in Japanese)
9) Yuki MIZUIDE, Hiroki TSUTSUMI, Kaoru AKIBA, Ryo SANUKI : Consideration on the layout forecast creation method of the infrastructure : A Study on the Evaluation Method of Infrastructures in Public Facility Management Part.1 , Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.127-128, 2016.8" (in Japanese)
10) Koya IKAI, Yuzuru NAGAI, Kaoru AKIBA, Hiroki TSUTSUMI, Yuki MIZUIDE, Ryo SANUKI : Study on the research method of vacant house : Study on the vacant house of the actual situation No.1 , Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.269-270, 2016.8 (in Japanese)
11) Yuzuru NAGAI, Koya IKAI, Kaoru AKIBA, Hiroki TSUTSUMI, Yuki MIZUIDE, Ryo SANUKI : Current status of the vacancy rate in Maebashi City, as seen from the survey : Research on the vacant house of the actual situation No.2, Summaries of technical papers of Annual Meeting, Architectural Institute of Japan, pp.271-272, 2016.8 (in Japanese)

Architectural Desing and History

Masao KOIZUMI

Katsuhiro KOBAYASHI

2. Proceedings of Oral Presentations

Katsuhiro KOBAYASHI, Akira KINOSHITA, et al., Studies on Design of Recent Skyscrapers, Part 20, Tendencies and Major Works in Milano, Summaries of Technical Papers of Annual Meeting, A.I.J., pp.209-210, Aug. 2016 (in Japanese)

Akira KINOSHITA, Yuta FUJIMOTO, Katsuhiro KOBAYASHI, Studies on Architectural Conversion in New York, Part1, Recent Examples of Hotels Converted from Office, Summaries of Technical Papers of Annual Meeting, A.I.J., pp.1-2, Aug. 2016 (in Japanese)

Yuta FUJIMOTO, Akira KINOSHITA, Katsuhiro KOBAYASHI, Studies on Architectural Conversion in New York, Part2, Recent Examples of Hotels Converted from Industrial Facilities, Summaries of Technical Papers of Annual Meeting, A.I.J., pp.3-4, Aug. 2016 (in Japanese)

Yukiko KAWABATA, Katushiro KOBAYASHI, Akira KINOSHITA, et al., Studies on the Architectural Conversion in Italy, Part 5, Design Methods seen in Converted Examples in Torino, Summaries of Technical Papers of Annual Meeting, A.I.J., pp.5-6, Aug. 2016 (in Japanese)

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Nobuyuki SUNAGA

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Eiko KUMAKURA

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