

Annual Report, Academic Year 2020

Department of Civil and Environmental Engineering

Position	Name		E-mail	Research Subject
Infrastructure Field				
Professor	Jun MURAKOSHI		murakos@tmu.ac.jp	Bridgel Engineering, Steel/Composite/Hybrid Structure, Fatigue, Buckling Stability, Long-Term Durability and Maintenance
Professor	Hiroyuki ONEYAMA		oneyama@tmu.ac.jp	Traffic Engineering, Transportation Planning, Transportation Environmental Analysis, Traffic Simulation, Transportation Network Analysis
Associate Professor	Tomoki ISHIKURA		iskr@tmu.ac.jp	Infrastructure Policy, National and Regional Planning, Macroeconomic Dynamics, Spatial Economics, Computable General Equilibrium Analysis
Associate Professor	Hitoshi NAKAMURA		hnaka@tmu.ac.jp	Structural Engineering, Bridge Engineering, Structural Characteristics of Cable-Supported Bridges, Application of Advanced Composite Materials for Infrastructures, Repair and Strengthening of Existing Structures
Assistant Professor	Yusuke KISHI		kishi@tmu.ac.jp	Structural Engineering, Seismic Engineering, Disaster Mitigation Engineering
Assistant Professor	Masami YANAGIHARA		yanagihara@tmu.ac.jp	Traffic Flow Analysis, Driving Behavior Modeling, Traffic Simulation, Traffic Psychology, Information Processing
Environmental System Field				
Professor	Akira KAWAMURA		kawamura@tmu.ac.jp	Hydrology, Water Resources Engineering, Urban Flood, Prediction of Hydro-Meteorological Phenomenon, Water Problems in Asia, Rainfall
Professor	Katsuhide YOKOYAMA		k-yoko@tmu.ac.jp	Environmental Hydraulics, Sediment Transport and Water Environment in a Reservoir, a River, and an Estuary
Associate Professor	Yasuhiro ARAI		y-arai@tmu.ac.jp	Water Supply Engineering, Environmental Engineering, Municipal Solid Waste Management Planning, Optimization Model
Associate Professor	Hiroshi SAKAI		h_sakai@tmu.ac.jp	Water and Wastewater Engineering, Water Environment Management, Water Quality Management
Associate Professor	Tetsuya SHINTANI		shintani@tmu.ac.jp	Coastal and Ocean Engineering, Stratified Flow, Computational Fluid Dynamics
Assistant Professor	Hideo AMAGUCHI		amaguchi@tmu.ac.jp	Hydrology, River Engineering
Safety and Disaster Prevention Field				
Professor	Nobuharu ISAGO		nisago@tmu.ac.jp	Stability evaluation of ground in mountain tunneling and shield tunneling, evaluation of load-bearing capacity of support member, maintenance methodology, and design and operation method of attached facilities of tunnel
Professor	Kimitaka UJI		k.uji@tmu.ac.jp	Reliability of Construction, Workability of Fresh Concrete, Durability of RC Structures, Repair and Strengthening
Associate Professor	Yoshiya ODA		oda@tmu.ac.jp	Exploration Geophysics, Seismic Inversion Method, Earthquake Disaster Prevention, Ground Motion Prediction
Associate Professor	Atsushi UENO		eagle@tmu.ac.jp	Concrete Engineering and Material Science, Environmental Consideration of Concrete and Concrete Making Materials, Evaluation of Properties of Concrete Making Materials
Associate Professor	Mitsutoshi YOSHIMINE		yoshimine-mitsutoshi@tmu.ac.jp	Soil Mechanics, Laboratory and Field Tests of Geomaterials, Soil liquefaction, Stability of Slopes and Embankments, Soil Dynamics, Transportation and Sedimentation of Debris
Assistant Professor	Kentaro OHNO		ohno@tmu.ac.jp	Concrete Engineering, Nondestructive Evaluation for Concrete Structures

(As of January 2020)

IMPORTANT LINKS :

The department of Civil and Environmental Engineering
Graduate School and Faculty of Urban Environmental Sciences
Tokyo Metropolitan University

<http://www.ues.tmu.ac.jp/civil/english/index.html>
<http://www.ues.tmu.ac.jp/en/index.html>
<http://www.tmu.ac.jp/english/index.html>

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Nobuharu ISAGO

【Position】 : Professor

【Research Topic】 : Tunnel Engineering, Urban Space Engineering, Rock Mechanics

【Outline of research achievement】

The research and investigation regarding road tunnel were performed in the following theme:

- 1) Mechanical behavior of support structure of mountain tunnel
- 2) Auxiliary method of mountain tunnel
- 3) Characteristics of structure of shield tunnel
- 4) Countermeasure against earthquake of road tunnel
- 5) Deformation mechanism of tunnel

Various results regarding planning, design, construction and rehabilitation of tunnel were acquired.

【Presentations】

- 1) Application of ground deterioration analysis related to soft rock swelling for deformed tunnel: Y.Okui, K. Nishimura, N.Isago, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 2) Experimental study of mechanical behavior of tunnel structure in enlarge-excavation: K.Inoue, N.Isago, A.Kusaka, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 3) Fundamental examination of prediction of tunnel lining stress by propagation velocity of ultrasound: T.Ishimura, A.Kusaka, N.Isago, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 4) Modelling of numerical analysis for forepiling on in-situ measurement: Y.Tatsumi, A.Kusaka, T.Sasaki, N.Isago, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 5) Analytical study of mechanical behavior of mountain tunnel constructed by timber-lagging method: Y.Ishii, N.Isago, A.Kusaka, T.Koide, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 6) Experimental study of largely deformed and collapse mechanism of tunnel: T.Morita, N.Isago, K.Nishimura, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 7) Analysis of effect of enlarging pilot tunnel on the stability of tunnel structure: K.Shinoda, N.Isago, S.Oomori, T.Okabe, A.Gomi, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 8) Experimental study of behavior of largely-deformed shield tunnel: K.Kurahashi, N.Isago,

N.Okamura, M.Ishida, M.Nakashima, K.Imafuku, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9

- 9) On-site test of rockbolt considering the effect of material and fixation: T. Matsumoto, Y.Goto, N.Isago, S.Morimoto, H.Nagao, Y.Koiike, T.Okabe, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9
- 10) Basic experiment of mechanical performance of rockbolt with different material: Y.Goto, T.Matsumoto, N.Isago, K.Maeda, D.Awaji, T.Okabe, Proceedings of Japan Society of Civil Engineers (JSCE) No.77 Annual Meeting, 2020.9

【Publications】

- 1) Mechanical properties below the heaving in deformed tunnel: Y.Okui, S.Kunimura, K.Maegawa, S.Kaise, K.Nishimura, N.Isago, ITA-AITES World Tunnel Congress 2020 Proceedings, 2020.9
- 2) Displacement control effect of the ground in front of the main tunnel face with the drift using high rigidity supports in the fragile ground: S.Ohmori, T.Okabe, N.Isago, ITA-AITES World Tunnel Congress 2020 Proceedings, 2020.9
- 3) Consideration on main tunnel behavior and design index of drift when applying the center drift advanced method: Sadatoshi Ohmori, Tadashi OKABE, Ayako GOMI and Nobuharu ISAGO, Journal of Japan Society Civil Engineering F1 (Tunnel Engineering), Vol. 76, No.2, p.I_1-I_20, 2021.2
- 4) A basic model experiment of the behavior surrounding ground in the excavation of a circular tunnel: Yoshitomo TATSUMI, Atsushi KUSAKA, Takaaki KOIDE and Nobuharu ISAGO, Proceedings of Tunnel Engineering, JSCE, CD-ROM, 2020.11
- 5) Experimental consideration of tunnel structure and ground behavior in widening section: Nobuharu ISAGO, Koshi INOUE, Atsushi KUSAKA, Takaaki KOIDE and Yoshitomo TATSUMI, Proceedings of Tunnel Engineering, JSCE, CD-ROM, 2020.11
- 6) Experimental study on large deformation and fracture behavior of tunnel lining: Tomohiro MORITA, Nobuharu ISAGO and Kazuo NISHIMURA, Proceedings of Tunnel Engineering, JSCE, CD-ROM, 2020.11
- 7) A study of 3D effect of forepiling during conventional tunneling: Toru SASAKI, Atsushi KUSAKA, Yoshitomo TATSUMI, Nobuharu ISAGO, Koki KIKUCHI and Takaaki KOIDE, Proceedings of Tunnel Engineering, JSCE, CD-ROM, 2020.11
- 8) Study on mechanical performance of rock bolts made of different materials: Yuto GOTO, Takuma MATSUMOTO and Nobuharu ISAGO, Proceedings of Tunnel Engineering, JSCE, CD-ROM, 2020.11
- 9) Japan Road Association Tunneling Committee, Technical guidebook of road tunnel (Structure edition) version 2020, Japan Road Association (shared writing), 2020.9
- 10) Study on the heaving mechanism of roadbed and design of its measures in mountain tunnels: Y.Okui, K.Nishimura, N.Isago, Tunnels and Underground, Vol.51 No.12, pp.67-78, 2020.12
- 11) Analysis of long-term behavior of tunnel lining with steel fiber reinforced concrete: K.Maeda,

N.Sakamoto, A.Kusaka, N.Isago. Civil engineering journal, 62-9, pp.32-35, 2020.9

【External Funding Sources】

Collaborative research with 3 organization, Specified Donation from 6 organizations

【Social Contributions (Excluding confidential activities)】

Member of Tunnel Engineering Committee, Japan Road Association

Chairman of Internal Board of ST D infrastructure, TC D.5 Road tunnel operation, Japan Road Association

Vice chair of Rock Mechanics Committee, Japan Society of Civil Engineers

Member of Tunnel Engineering Committee, Japan Society of Civil Engineers

Member of Technical Committee, Japan Tunneling Association

Member of Working Group 21 Life cycle asset management, International Tunneling Association

【Awards】

None

【Other Activities】

- 1) Britannica International Yearbook, Civil engineering tunnel, pp.224-225, 2020.5
- 2) Revision of Standards and Commentary for Installation of Emergency Facilities in Road Tunnels:
N.Isago, T.Nanazawa, A.Kusaka and S.Morimoto, Tunnels and Underground, Vol.51, No.11,
pp.57-68, 2020.11
- 3) Q & A of road tunnel maintenance for tunnel engineers, Japan Tunneling Association (shared writing), 2020.12
- 4) 46th ITA General Assembly and World Tunnel Congress Report, Tunnels and Underground (shared writing), Vol.52, No,2, pp.61-68, 2021.2

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Kimitaka UJI

【Position】 : Professor

【Research Topic】 : Fresh Concrete, Construction technology, Improving the quality of concrete structure, Repair and Strengthening

【Outline of research achievement】

- 1) Fluidity and segregation resistance of fresh concrete were studied for the purpose of improving the quality and durability of concrete structures. From the experimental study, it was clarified that the viscosity affects the quality and durability of concrete structure, and adequate fluidity of concrete is important for the homogenization of cover concrete.
- 2) It was cleared from the pore size distribution and the compressive strength of concrete specimens that the quality and durability of steam-cured pre-cast concrete were improved with the sprinkling water under steam cure process.
- 3) The shear bond strength in cross-section repair was experimentally investigated with attention to the shapes of the interface between existing concrete and repair mortar.

【Presentations】

- 1) “Effect of the water absorption rate of fine aggregate produced by volcanic deposit on the compressive strength of mortar”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-27, 2020.9 [in Japanese]
- 2) “Basic study on the properties and dispersibility of Polypropylene fibers in paste”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-249, 2020.9 [in Japanese]
- 3) “Effect of mixture proportions on the segregation and compaction when passing through rebar gaps”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-281, 2020.9 [in Japanese]
- 4) “Effect of coarse aggregate on the relationship between compressive stress of concrete and change rate of ultrasonic speed”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-368, 2020.9 [in Japanese]
- 5) “Basic study on the detection technology for horizontal cracks in RC deck slab by a combination of impact elastic wave method and aperture synthesis method”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-371, 2020.9 [in Japanese]
- 6) “Influential factors on the estimation of thickness of concrete members by ultrasonic tomography method”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-372, 2020.9 [in Japanese]
- 7) “Effect of primer and cross-sectional dimensions on shear bond characteristics between substrate concrete and repairing mortar”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-402, 2020.9 [in Japanese]

8) “Analytical study on shear bearing capacity of RC member strengthened with lining high strength fiber reinforced mortar”, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-599, 2020.9 [in Japanese]

【Publications】

- 1) Ryota KASAKURA, Toshiyuki KUROIWA, Toshiya TADOKORO and Kimitaka UJI, “EXPERIMENTAL STUDY ON DUCTILITY OF RC MEMBERS WRAPPED BY STEEL AND HIGH STRENGTH FIBER REINFORCED MORTAL”, Journal of JSCE E2 (Materials and Concrete Structures), Online ISSN:2185-6567 ISSN-L:2185-6567、Vol.76, No.3, pp.229-238, 2020.8 [in Japanese]
- 2) Kakeru Ishigaki, Kentaro Ohno, Kimitaka Uji and Atsushi Ueno, “Evaluation method for the durability of repair mortar for bioactivated carbon adsorption pond”, Proceedings of the Japan Concrete Institute, Vol.42, No.1, pp.515-520、2020.6 [in Japanese]
- 3) Kentaro Ohno, Masaru Hagiwara, Atsushi Ueno and Kimitaka Uji, “Study on the detection technology for horizontal cracks in RC deck slab by a combination of impact elastic wave method and aperture synthesis method”, Proceedings of the Japan Concrete Institute, Vol.42, No.1, pp.1624-1629, 2020.6 [in Japanese]
- 4) Takumi Mori, Kentaro Ohno, Kimitaka Uji and Shin-ichi Miyazato, “Detection accuracy for deterioration of adhesion between re-bar and concrete in RC members by impact elastic wave method”, Proceedings of the Japan Concrete Institute, Vol.42, No.1, pp.1678-1683、2020.6 [in Japanese]
- 5) A. Toriumi, Y. Hara, K. Uji and A. Ueno, “Drying and Pore Structure of Steam-Cured Concrete Products”, Concrete Journal, Vol.58, No.11, pp.878-883, Nov. 2020 [in Japanese]
- 6) R. Tani, S. Saito, K. Ohno and K. Uji, “Segregation Resistance and Compaction Ability of Concrete with Different Viscosities when Passing through Rebar Gaps”, Concrete Journal, Vol.58, No.11, pp.884-891, Nov. 2020 [in Japanese]
- 7) Kentaro Ohno, Atsushi Ueno, Kimitaka Uji, Makoto Yamada, Shohei Sakuraba and Kentaro Takase, “Deterioration factors for concrete surface of bioactivated carbon adsorption pond and selection of binder for repair mortar”, Journal of Japan Water Works Association, Vol.89, No.12, pp.2-18, 2020.12 [in Japanese]

【External Funding Sources】

- “Evaluation of peeling risk for interface of existing concrete/repair-material and its integrity ensure”, Principal Investigator, Grant-in-Aid for Scientific Research (C), 2018-2020.
- Donation for research :
 - 1) JAPAN PRECAST CONCRETE PRODUCTS ASSOCIATION
 - 2) Road Precast Concrete Association
 - 3) BASF Japan Co. (Academic consultation)

【Social Contributions (Excluding confidential activities)】

- 1) Ministry of International Trade and Industry, JISC standard First Committee member, Chair of Civil Technical Committee
- 2) Ministry of Land, Infrastructure, Transport and Tourism, Sobu Regional National Highway Office, etc., Comprehensive Evaluation Committee Member
- 3) Japan Prestressed Concrete Institute, President, Chair of Concrete Structures Diagnosis Engineer Committee, and so on
- 4) Central Nippon Expressway Company Limited, Tokyo branch/ Hachioji branch, Member of technology round-table conference
- 5) Road Precast Concrete Association, Technical Committee Member

【Awards】

【Other Activities】

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Hiroyuki Oneyama

【Position】 : Professor

【Research Topic】 : Traffic and Transportation Engineering

【Outline of research achievement】

1) Regarding the moving light guide system as a countermeasure against traffic congestion on the highway, behavioral and simulation analysis on the following behavior in non-congestion flow under the mixture of autonomous vehicles was conducted. We also investigated demonstration and model analysis on rest functions at roadside stations, fluctuation of saturation flow rate at signalized intersections using traffic detectors, the comparative study of the calculation method of saturation flow rate by observation, and the influence of the lamp positions on the driver behaviors at geometrically complicated intersection.

【Presentations】

- 1) Analysis of break stop-by behavior at facilities along general roads based on WEB questionnaire, Proceedings of Infrastructure Planning (JSCE), Vol.61, 2020.6 [in Japanese].
- 2) Construction of Prediction Model of Congestion / Accident Occurrence on Intercity Expressway Based on Sensor Data, Proceedings of Infrastructure Planning (JSCE), Vol.61, 2020.6 [in Japanese].
- 3) Analysis of break stop-by behavior at facilities along general roads based on WEB questionnaire, Proceedings of Annual Conference of JSCE, No.75, IV-52, 2020.9 [in Japanese].
- 4) Analysis of changes in stress indicators over time due to lane changes, Proceedings of Annual Conference of JSCE, No.75, IV-39, 2020.9 [in Japanese].
- 5) Influence of Moving Light Guide System on Traffic Flow under Autonomous Vehicle, Annual Meeting of Japan Society of Traffic Engineers, Vol.40, 2020.9 [in Japanese].
- 6) A Study on the Effect of the Lamp Position of Traffic Signal Lights on Right Turn Behavior, Annual Meeting of Japan Society of Traffic Engineers, Vol.40, 2020.9 [in Japanese].
- 7) Comparison of Interior Structures in Expressway Tunnels, ITA-AITES World Tunnel Digital Congress (WTC 2020) and 46th General Assembly - Technical Paper Presentation, Paper ID:15, 2020.9.
- 8) Construction of Rest Function Verification Method for Facilities along General Roads Based on WEB Questionnaire, Proceedings of Infrastructure Planning (JSCE), Vol.62, 2020.11 [in Japanese].
- 9) Stop-by Behavior Analysis of Rest Facilities for Passenger Vehicles, Proceedings of Infrastructure Planning (JSCE), Vol.62, 2020.11 [in Japanese].
- 10) The Effect of High Proportion of Motorcycle to Accident Risk in Mixed-Traffic Condition,

Proceedings of Infrastructure Planning (JSCE), Vol.62, 2020.11 [in Japanese].

- 11) Influence of Moving Light Guide System on Traffic Flow in Presence of Autonomous Vehicles, ITS Symposium, No.18, 2-A-02, 2020.12 [in Japanese].
- 12) Study on New Standardization of Interior Finishing in Expressway Tunnel, Proceedings of Tunnel Engineering, JSCE, No.30, CD-ROM, 2020.11 [in Japanese].
- 13) Effect of Motorcycle Composition to Motorcyclist and Other Motor Vehicle Accident Rate in Mixed Traffic Condition, Transportation Research Board 100th Annual Meeting, Presentation Number: TRBAM-21-01783, 2021.1.

【Publications】

- 1) Hiroyuki ONEYAMA, Satoshi NIIKURA, Masami YANAGIHARA, Takashi OGUCHI : Study on Real-Scale Experiments of Driving Behavior at Signal Change Intervals Related to the Locations of Traffic Signal Heads, Sensan Kenkyu, Vol.72, No.3, pp.269-274, 2020.6, DOI : 10.11188/seisankenkyu.72.269 [in Japanese].
- 2) Hiroaki TERADA, Masami YANAGIHARA, Hiroyuki ONEYAMA : Analysis on Influence of Moving Light Guide System on Traffic Flow under Autonomous Vehicle, JSTE Journal of Traffic Engineering, Vol.7, No.2, pp.A_216-A_225, 2021.2, DOI : 10.14954/jste.7.2_A_216 [in Japanese].
- 3) Hirotaka OOKI, Masami YANAGIHARA, Hiroyuki ONEYAMA : A Study on the Effect of the Lamp Position of Traffic Signal Lights on Right Turn Behavior, JSTE Journal of Traffic Engineering, Vol.7, No.2, pp.A_298-A_306, 2021.2, DOI : 10.14954/jste.7.2_A_298 [in Japanese].
- 4) H.Oneyama : Current Status and Problems of Road Traffic Noise and Air Pollution, Transport Policy in Perspective 2020, pp.76-77, 2021.2, DOI : 10.20717/jrctptpj.2020.0_76 [in Japanese].
- 5) H.Terada, M.Yanagihara, H.Oneyama : Influence of Moving Light Guide System on Traffic Flow in Presence of Autonomous Vehicles, International Journal of Intelligent Transportation Systems Research, 2021.2, DOI : 10.1007/s13177-021-00252-7.
- 6) H.Oneyama : Current Status and Problems of Road Traffic Noise and Air Pollution, Transport Policy in Perspective 2020, pp.52-53, 2021.3, DOI : 10.20717/jrctptpe.2020.0_52.

【External Funding Sources】

- Grant-in-Aid for Scientific Research (C) Applicability of moving light guide system to traffic control in the presence of autonomous vehicles (Principal Investigator, 2019-2021)
- Grant-in-Aid for Scientific Research (B) Results and formation process of neoliberal city planning system in East Asian megacities (Co-Investigator, Principal Investigator : Shin Aiba, 2018-2020, extended to 2021)

【Social Contributions (Excluding confidential activities)】

- Japan Society of Traffic Engineers : Vice Chairperson, research committee and Chairperson, research planning subcommittee, Member, General Affairs Committee, Member, Qualification committee, Lecturer, intersection design training seminar and Member, First academic subcommittee and Member, Paper Award and Technical Award Selection Committee.
- Road Bureau, Ministry of Land, Infrastructure, Transport and Tourism : Member, Regional

- Economic Strategy Study Group.
- College of Land, Infrastructure, Transport and Tourism, Ministry of Land, Infrastructure, Transport and Tourism: Lecturer.
 - Tokyo National Highway Office, Kanto Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism : Member, Study Committee on the Bicycle Traffic Space Improvement Plan.
 - Express Highway Research Foundations of Japan : Member, Editorial committee and Chairperson, Paper Award Selection Committee.
 - Sagami City : Member, Environmental Impact Assessment Committee
 - Hino City : Chairperson, Universal Design Association and Sub Chairperson , Regional Public Transportation Conference
 - Akiruno City : Chairperson, Public Transportation Examination Conference
 - Funabashi City : Chairperson, Road Safety Diagnosis.
 - NEXCO Research Institute Limited : Chairperson, Study Committee on the interior board in tunnel
 - East Nippon Expressway Co. Ltd. : Member, Kanto branch office traffic control measures committee
 - Central Nippon Expressway Co. Ltd. : Chairperson, Study Committee on provision methodology of road information in the Greater Tokyo Area
 - Metropolitan Expressway Co. Ltd. : Member, Study Meeting on traffic safety measures in the Metropolitan Expressway and Member, Study Meeting on traffic flow estimation.
 - PIARC, World Road Association : Member, Technical Committee(TC)3.1

【Awards】

-None

【Other Activities】

-None

【Department】 : Department of Civil and Environmental Engineering, School of Urban Environmental Sciences

【Name】 : Akira KAWAMURA

【Position】 : Professor

【Research Topic】 : Hydrology, Water Resources Engineering

【Outline of research achievement】

- 1) This study proposes a novel generalized storage function (GSF) model for water level estimation from the rating curve relationship by considering (i) the spatial distribution of rainfall over the basin and (ii) incorporating all the possible inflow and outflow components to reduce the uncertainties involved. The proposed GSF model, along with three other models, was then applied in two watersheds of Japan to examine its applicability in different types of watersheds with optimized parameters: (i) the Iga watershed, a semiurban watershed and (ii) the Oto watershed, a rural watershed. Further, the proposed model's effectiveness was identified based on hydrograph reproducibility, Akaike information criterion, and Akaike weight. The results showed that the GSF model performed well in both watersheds compared to the other models. Moreover, the Morris global sensitivity method has used to analyze the sensitivity of the GSF model parameters for the objective function of root mean square error.
- 2) Analysis of the interrelationships between the barriers to IFRM adaptation has not been carried out yet. This study analyzed the interrelationships between the barriers to IFRM adaptation using the Interpretive Structural Modeling (ISM) method. The barriers in Metro Manila, a megacity in a developing country, were identified first in this study. Then, the ISM method was slightly modified and applied to analyze the interrelationships of the identified 12 barriers. Through the application of the ISM method, the interrelationships of the barriers to IFRM adaptation were systematically analyzed for the first time while also showing their hierarchical diagram. The results of the ISM revealed that barriers in the governance aspect are the most influential in which the lack of a sole organizing body is the most influential barrier.
- 3) This study attempts to conduct a monitoring & evaluation (M&E) of the integrated flood risk management (IFRM) in Metro Manila. In this study, we monitored the performance level at each city in Metro Manila by carrying out a series of interviews and surveys. The performance for IFRM based on the 15 indicators we utilized in this study was appraised qualitatively by the practitioners from each city in Metro Manila. Then, the monitored qualitative appraisals were evaluated using the fuzzy set theory, which was a suitable method for handling imprecise or qualitative data. The indicators and qualitative appraisals were given fuzzy weights, and these were aggregated to evaluate the overall performance for IFRM for each city. The results show that majority of the cities in Metro Manila are performing above the Good level, but this level still suggests that more work and attention are needed to attain substantial achievements for IFRM. The approach in this study is suitable for M&E activities that heavily depended on qualitative data or information.
- 4) Urban floods occur frequently, and there are great expectations for the application of machine learning models that can be easily constructed to flood forecasting fields in urban medium and small size basin, which have

complicated runoff mechanisms. Therefore, in this study, we constructed a deep learning model using an actual river basin dataset of urban small and medium rivers, which was created at a short observation interval of 1 minute, which is different from that of large river basins. Benchmark tests were performed when the parameters were changed. An ANN model was also constructed for comparison with the deep learning model, and the performance was evaluated by a new index called the PD ratio, which is the number of parameters of the deep learning model and the number of observed data. As a result, it was found that the deep learning model is superior to the ANN model for the learning/verification flood at the same PD ratio, and in particular, the ANN model shows rapid fluctuations in the verification flood that do not follow the actual results.

【Presentations】

One Presentation at the 28th Symposium on Global Environment of JSCE (September 25, 2020)

- Takasaki, T., Kawamura, A., Amaguchi, H., Murai, M. and Ishihara, S. : Construction of urban small to medium sized river basin dataset for rainfall runoff benchmark test.

Thirteen Presentations at the Kanto Branch Annual Conference of JSCE (March 1 to 3, 2021)

For Example;

- T.T.P.Bui, A.Kawamura, H.Amaguchi, D.D. Bui, J.M.Mercado: Simulation of suspended sediment concentration at upper Srepok river basin in Vietnam using HYPE model.

【Publications】

* IF paper

1)* Mercado, J.M.R., Kawamura, A and Amaguchi, H. (May 2020)

Interrelationships of the barriers to integrated flood risk management adaptation in Metro Manila, Philippines.
International Journal of Disaster Risk Reduction, Vol.49, online; doi:10.1016/j.ijdr.2020.101683.

2)* Padiyedath, S.G., Kawamura, A., Amaguchi, H., Takasaki, T. and Azhikodan, G. (June 2020)

A generalized storage function model for the water level estimation using rating curve relationship.
Water Resources Management, Vol.34, Issue 8, pp.2603-2619; doi:10.1007/s11269-020-02585-6.

3) Mercado, J.M.R., Kawamura, A, Amaguchi, H. and Prudencio-Rubio, C.J.C. (September 2020)

Multi-criteria monitoring & evaluation analysis of integrated flood risk management in Metro Manila.
Journal of Japan Society of Civil Engineers, Ser.G (Environmental Research), Vol.76, No.5, pp.I_269-I_276.

4) Amaguchi, H, and Kawamura, A. (September 2020)

A proposal of urban storm runoff model considering green infrastructures and its application.
Journal of Japan Society of Civil Engineers, Ser.G (Environmental Research), Vol.76, No.5, pp.I_319-I_325.

5) Fujizuka, S., Kawamura, A., Amaguchi, H. and Takasaki, T. (September 2020)

Emulation evaluation of urban runoff model by deep learning for the virtual hydrograph with observation noise.
Journal of Japan Society of Civil Engineers, Ser.G (Environmental Research), Vol.76, No.5, pp.I_383-I_391.

6) Fujizuka, S., Kawamura, A., Amaguchi, H. and Takasaki, T. (November 2020)

Rainfall runoff benchmark test by deep learning model using urban medium and small river basin dataset.
Journal of Japan Society of Civil Engineers, Ser.B1 (Hydraulic Engineering), Vol.76, No.2, pp.I_355-I_360.

7) Mercado, J.M.R., Kawamura, A, Amaguchi, H. and Prudencio-Rubio, C.J.C. (November 2020)

Fuzzy-based M&E of the IFRM performance in Metro Manila.
Journal of Japan Society of Civil Engineers, Ser.B1 (Hydraulic Engineering), Vol.76, No.2, pp.I_685-I_690.

8) Kawamura, A. (May 2020)

Ask the person on the cover
The Suido Koron, Vol.56, No.5, pp.18-21.

【External Funding Sources】

- Principal Investigator, Advance Research Project "Study on guerrilla rainstorm, flood, and water pollution in megacity urban watersheds - Countermeasures against megacity urban water-related disasters bipolarized by climate change" Tokyo Human Resources Fund for City Diplomacy, Tokyo Metropolitan Government, (2016-2020)
- Japan side Principal Investigator, 'Erasmus+' Program with Reykjavik University (2017-2021)
- Representative, Research Fund entitled "Effectiveness Assessment of Deep Learning for Flood Runoff Analysis", Society of Practical Hydrological Systems, (2018-2020)
- Representative, Consulting entitled "River Flood Runoff Prediction", Fujitsu Laboratories Ltd. (2019-2020)

【Social Contributions (Excluding confidential activities)】

- Committee Member; IAHS Committee, Japan Geoscience Union, Science Council of Japan
- Auditor, Board Member; Japan Society of Hydrology and Water Resources
- Advisor; Committee on Global Environment, JSCE
- Member; Editorial Committee on Annual Journal of Global Environment Research, JSCE
- Committee Member; Research Planning Committee, JSCE
- Chairman; Editorial Committee on Journal of Hydrological System, Association for Rainwater Storage and Infiltration Technology
- Lecturer; Technical Course of Lectures on Building Environment and Sanitation, Japan Architecture Hygiene Management Education Center

【Awards】

Nothing in particular

【Other Activities】

- Collaboration Research with Reykjavik University, Iceland through ERASMUS+ Program.
- Collaboration Research with River Division, the Bureau of Construction, Tokyo Metropolitan Government
- Collaboration Research with Civil Engineering Support and Training Center, Bureau of Construction, Tokyo Metropolitan Government
- Patent registration, Patent No. 6798683 : Polygon-type surface feature data creation method and polygon-type surface feature data creation program
- Patent registration, Patent No. 6830232 : Automatic design method of sewerage pipeline network and automatic design method of sewerage pipeline network

【Department】 : Department of Civil and Environmental Engineering, Faculty of Environmental Engineering

【Name】 : Jun MURAKOSHI

【Position】 : Professor

【Research Topic】 : Bridge Engineering, Steel Bridge Design, Remaining Load-carrying Capacity Evaluation and Fatigue Evaluation of Steel Highway Bridge, Repair and Strengthening

【Outline of research achievement】

1) Research on performance evaluation of SFRC overlays as a measure to improve durability of existing orthotropic steel decks

Murakoshi,J.

With rapid increase of truck weight and traffic volume in Japan, various types of fatigue cracks have recently been observed in existing orthotropic steel decks (OSDs) under severe traffic condition. As an effective retrofit measure to prevent those cracks, steel fiber reinforced concrete (SFRC) overlays have been increasingly used for damaged OSDs. On the other hand, there are not sufficient data to confirm its durability. It is important to investigate the durability performance under the effect of repeated wheel load and environmental action. The purpose of the research is to clarify durability of adhesively bonded joints between SFRC and deck plate, and to propose testing procedures for evaluating the durability.

In this fiscal year, in order to clarify deterioration tendencies of the adhesive joints, core extraction tests of the joints were conducted using small-size test specimens with two types of adhesives. Also, the same tests were done for test specimens exposed to the environmental condition for about 12 years.

2) Research on evaluation of fatigue durability of existing steel I-girder highway bridges

Murakoshi,J. and Kishi,Y.

Serious fatigue damage which may lead to fracture of main girder have been observed on existing steel I-girder highway bridges under severe traffic condition. To assure structural safety of huge number of aging steel bridges, it is important to manage those bridges by efficiently using information about fatigue vulnerability in addition to periodic inspection. The purpose of this research is to assess fatigue vulnerability of existing steel I-girder bridges constructed in 1960's and 1970's, when fatigue design was not conducted.

In this fiscal year, based on the design data sets of old steel I-girders with various structural dimensions, a simplified method to estimate live load stress of main girders for fatigue design by using load distribution factor were proposed by regression analyses. Also, based on the bridge inspection data of national highway, tendencies of fatigue damages were investigated focusing on cracks at main girder-cross beam connection of steel I-girder bridges.

3) Research on evaluation method of remaining load carrying capacity for existing structural members in steel and composite structures

Murakoshi, J., Nogami, K. and Kishi, Y.

In Japan, majority of highway bridges was constructed during the high economic growth period and the number of bridges over 50 years is increasing drastically. With increase of aging bridges, it is highly probable that deteriorated bridges increase rapidly since many of them are exposed to heavy traffic condition and severe natural environment. Corrosion is a major damage for steel bridges, especially at girder end, and sectional loss of structural members can result in decrease of the load carrying capacity. With regards to steel truss bridges, severe corrosion with sectional loss around gusset connections often have possibility to lead to a crucial problem such as bridge collapses. However, in the both cases, since corrosion appears in various forms, for the present, effective techniques to evaluate the ultimate strength of the whole bridge with corroded members are under development. This research focuses on proposing a practical approach for evaluating remaining capacity of bridge systems with severe corroded bridge members.

In this fiscal year, finite element analyses were conducted for a corroded riveted steel girder bridge and a welded steel girder bridge in order to clarify the ultimate behavior/load bearing capacity under seismic lateral load. Also, finite element analyses were done for compressive truss members with section losses to clarify the effect of the section loss on the remaining strength and a practical evaluation method of remaining strength were proposed.

4) Research on fatigue durability improvement of welded joints of orthotropic steel deck bridges

Murakoshi, J.

With rapid increase of vehicle weight and traffic volume in Japan, various types of fatigue cracks have recently been observed in existing orthotropic steel deck (OSD) bridges under severe traffic condition, resulting from the complicated welded details combined with local stresses that can be difficult to quantify in the design. Regarding the design of OSDs, fatigue-resistant details are specified in the Specifications for Highway Bridges. However, in some structural details, further research is considered necessary to standardize appropriate structural details with more fatigue durability for newly constructed OSD bridges. In this research, focusing on top details of vertical stiffener of OSD bridges, fatigue improvement details, upper end cut details, are experimentally/analytically compared with the current details from the viewpoint of fatigue resistance.

In this fiscal year, fatigue tests for current details and upper end cut details were continuously conducted to compare with the fatigue behaviors and the improvement effect of fatigue life was clarified.

【Presentations】

- 1) Huang, Z., Murakoshi, J., Nogami, K. and Kishi, Y., Numerical study on compressive strength of box section member with uniform local section loss, 28th Constructional Steel Annual Symposium, JSSC, 2020.11.(in Japanese)
- 2) Shishido, K., Murakoshi, J., Ono, S. and Chiba, H., Experimental study on deterioration characteristics of adhesive joints in SFRC overlay on orthotropic steel deck, 28th Constructional Steel Annual Symposium, JSSC, 2020.11.(in Japanese)
- 3) Yamamoto, K., Murakoshi, J., Josen, Y. and Takahashi, M., Investigation of fatigue crack tendency at main girder-cross beam connection in steel I-girder bridges, 28th Constructional Steel Annual Symposium, JSSC,

2020.11.(in Japanese)

【Publications】

- 1) Matsumoto, T., Murakoshi, J., Ono, S., Takahashi, M. and Mori, T., Experimental study on fatigue behavior of adhesively bonded joint in orthotropic steel deck overlaid with SFRC, Journal of JSCE, Ser.A1, Vol.76, No.5, II_72-II_83, 2020.5. (in Japanese)
- 2) Ishikawa, R., Murakoshi, J., Kishi, Y., Josen, Y., Sawada, M. and Tashiro, D., Study on estimation method of fatigue live load stress for fatigue evaluation of existing steel I-girder bridges, Journal of Structural Engineering, JSCE, Vol.67A, pp.518-528, 2020.3. (in Japanese)
- 3) Huang, Z., Murakoshi, J., Nogami, K. and Kishi, Y., Numerical study on compressive strength of box section member with uniform local section loss, Proceedings of Constructional Steel, JSSC, Vol.28, pp.84-93, 2020.11. (in Japanese)
- 4) Shishido, K., Murakoshi, J., Ono, S. and Chiba, H., Experimental study on deterioration characteristics of adhesive joints in SFRC overlay on orthotropic steel deck, Proceedings of Constructional Steel, JSSC, Vol.28, pp.167-176, 2020.11. (in Japanese)
- 5) Yamamoto, K., Murakoshi, J., Josen, Y. and Takahashi, M., Investigation of fatigue crack tendency at main girder-cross beam connection in steel I-girder bridges, Proceedings of Constructional Steel, JSSC, Vol.28, pp.666-675, 2020.11. (in Japanese)
- 6) Ishikawa, R., Murakoshi, J. and Kishi, Y.: Study on the load distribution factor for fatigue evaluation of steel girder bridges, Proceedings of 10th International Conference of Bridge Maintenance, Safety and Management, 2020.6.

【External Funding Sources】

- Study on degradation characteristics and durability evaluation of adhesive joints between orthotropic steel deck and SFRC overlay, Principal Investigator, JSPS KAKENHI Grant No.18K04326, FY2018-FY2020
- Study on evaluation of remaining load carrying capacity of steel girder ends II, Principal Investigator, Research funds, JISF, FY2020
- Study on fatigue durability evaluation of existing steel highway bridges, Principal Investigator, Highway Technology Research Center, Specific Research Donations, FY2019-FY2020
- Fatigue durability improvement of top details of vertical stiffener of orthotropic steel deck, JSBA, Specific Research Donations, FY2017-FY2020

【Social Contributions (Excluding confidential activities)】

- Japan Road Association, Member of Committee on Bridges
- JSCE, Member of Committee on Steel Structure, Chairman of Sub-committee for Standard Specifications for Steel and Composite Structures
- College of Land, Infrastructure, Transport and Tourism, MLIT, Lecturer of Training Course on Design and Maintenance of Highway Structures

- Ehime University, Lecturer of Maintenance Experts Training Course
- Tokyo Metropolitan Public Corporation by Road Improvement and Management, Lecturer of Bridge Maintenance Professional Engineering Training Course

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Katsuhide YOKOYAMA

【Position】 : Professor

【Research Topic】 : Environmental Hydraulics, Sediment Transport, Reservoir, Estuary

【Outline of research achievement】

The purpose of the research is to analyze the transport process of water, sediment and nutrient through rivers from forest to estuary. The achievements of this year are as follows; sediment yield model was developed considering the effect of soil protection by forest vegetation, saltwater movement and DO consumption in the Shakujii River, Sumida River and Arakawa River were analyzed by using three dimensional hydrodynamic model, the particle migration model was developed to analyze the movement of fish and oyster eggs.

【Presentations】

- 1) Gunay, C.J.C., Nakagawa, C. and Yokoyama, K. (2020). Analyzing long-term changes in water discharge and soil condition of Ogouchi Reservoir catchment. Proceedings of the 22nd Congress of International Association of Hydro-Environment Engineering and Research – Asia-Pacific Division, Sapporo, Japan.
- 2) Nwe, L.W., Azhikodan, G., Yokoyama, K., Kodama, M., Hlaing., N.O., Tun, N.N. (2020). Diatoms and dinoflagellates distribution during dry season in macrotidal Tanintharyi River estuary, Myanmar. Proceedings of the 22nd IAHR-APD (International Association of Hydro-Environment Engineering and Research – Asia-Pacific Division) Congress 2020, Sapporo, Japan.
- 3) Gunay, C.J.C., Nakagawa, C., Yokoyama, K., Sakai, H., Koizumi, A., Iwasaki, H. and Chiba, T. (2020). Changes in soil hydrological condition of Ogouchi Dam catchment from SWAT monthly discharge analysis for 57 years. Japan Water Works Association, Reiwa 2nd National Waterworks Research Presentation Lecture, pp. 762-763.
- 4) Duka, M., Iguchi, K., Yokoyama, K., Sakai, H., Koizumi, A., Chiba, T., Toshiaki, U. (2020) Effect of Selective Withdrawal and Vertical Curtain on Turbid Water Flow after a Flood Event in the Ogouchi Reservoir: Field Observation and 3D Numerical Simulation, Japan Water Works Association, Reiwa 2nd National Waterworks Research Presentation Lecture, pp. 760-761.

【Publications】

- 1) Yamamoto, M., Liu Dan, Fukushima, K., Yokoyama, K., (2020) The influence of freshwater from terrestrial sources on the concentrations of iron in Kesenuma Bay, Japan, after the 2011

tsunami, Estuarine, Coastal and Shelf Science, 233, 106408, <https://doi.org/10.1016/j.ecss.2019.106408>

- 2) Okuyama, R., Arai, Y., Yokoyama, K., (2020) Statistical Analysis of Risk Factors Causing Scum Generation in Urban Estuary, Journal of JSCE, Ser. G (Environment Research), 76(7), III_529-III_534.
- 3) Inagawa, S., Asano, K., Okuyama, R., Casila, J.C., Yokoyama, K., (2020) Physical Properties and Characteristics of Erosion and Deposition of Organic Sludge in Urban River Estuaries, Journal of JSCE, Ser. B1 (Hydraulic Engineering), 76(2) , I_1291-I_1296.
- 4) Matsushita, K., Yokoyama, Y., Nakayama, K., Hatakeyama, M., (2020) Temporal Variation of Salinity and Dissolved Oxygen in a Saltmarsh Formed after the great east Japan earthquake, Journal of JSCE, Ser. G (Environment Research), 76(5), I_27-I_32.
- 5) Kaneko, Y., Olap, N., Yokoyama, K., (2020) Effect of Saltwater Intrusion on Water Distribution at the Confluence of Chikugo Estuary, Journal of JSCE, Ser. B1 (Hydraulic Engineering), 76(2), I_1405-I_1410, 2020.
- 6) Kuroda, N., Yokoyama, K., Ishikawa, T., (2020) Study on Estimation Method of Soil Salinity Variation in Tidal Flat Wetlands in Wand, Gotanno, Downstream of Arakawa River, Tokyo, Japan, Journal of JSCE, Ser. B1 (Hydraulic Engineering), 76(2), I_1285-I_1290, 2020.
- 7) Casila, J.C., Azhikodan, G., Yokoyama, K., (2020) Quantifying water quality and flow in multi-branched urban estuaries for a rainfall event with mass balance method, Water Science and Engineering, Open Access, <https://doi.org/10.1016/j.wse.2020.12.002>
- 8) Somsook, K., Duka, M.A., Olap, N.A., Casila, J.C.C., Yokoyama, K., 2020. Direct measurement of secondary circulation in a meandering macrotidal estuary, Science of the Total Environment, 739, 15, <https://doi.org/10.1016/j.scitotenv.2020.139503>
- 9) Azhikodan, G., Yokoyama, K., (2021) Erosion and sedimentation pattern of fine sediments and its physical characteristics in a macrotidal estuary, Science of The Total Environment, 753, 20, <https://doi.org/10.1016/j.scitotenv.2020.142025>
- 10) Duka, A., Shintani, T., Yokoyama, K., (2021). Thermal stratification responses of a monomictic reservoir under different seasons and operation schemes, Science of The Total Environment, 767, <https://doi.org/10.1016/j.scitotenv.2020.144423>
- 11) Nwe, L.W., Azhikodan, G., Yokoyama, K., Kodama, M., (2021) Spatio-temporal distribution of diatoms and dinoflagellates in the macrotidal Tanintharyi River estuary, Myanmar., Regional Studies in Marine Science, 101634. <https://doi.org/10.1016/j.rsma.2021.101634>.

【External Funding Sources】

Control of Water Exchange and its Effect on Material Budget and Estuarine Ecosystem in a Salt Marsh Formed by Tsunami Disaster, JSPS KAKENHI, Grant-in-Aid for Scientific Research (A), 18H03799

【Social Contributions (Excluding confidential activities)】

【Awards】

【Other Activities】

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Yasuhiro Arai

【Position】 : Associate Professor

【Research Topic】 : Water Supply Engineering, Environmental Systems

【Outline of research achievement】

- 1) Regarding water supply engineering, research on updating and maintenance of water pipe networks and research on water leakage detection using IoT and AI were carried out.
- 2) Regarding waste treatment, research was conducted on the stable operation of incineration facilities and the effective use of incineration residues in response to changes in waste composition.

【Presentations】

- 1) Arai, Yasuhiro, Toyono Inakazu, Akira Koizumi, Hiroshi Sakai, Kazuhisa Fujikawa, Katsushi Sasaki and Naho Tsutsui. 2020. "Analysis of actual water use based on questionnaire survey data-Statistical analysis focusing on the difference between old and young in single-person households-" Reiwa 2nd JWVA Annual Conference and Symposium, 100-101. (in Japanese)
- 2) Kunizane, Takaharu, Yasuhiro Arai, Akira Koizumi, Koudai Arai, Seiichi Awata, Junya Sakakura and Noriaki Ito. 2020. "Analysis of the relationship between the diagnosis results by the water supply jurisdiction camera survey and the flow conditions in the jurisdiction." Reiwa 2nd JWVA Annual Conference and Symposium, 324-325. (in Japanese)
- 3) Hasegawa, Kouhei, Yasuhiro Arai, Takaharu Kunizane, Akira Koizumi, Hiroki Ariyoshi, Kenichi Suzuki, Katsuhiko Kaji and Shinichi Moriyama. 2020. "Cost-benefit analysis of pipeline monitoring system using leak detection sensor." Reiwa 2nd JWVA Annual Conference and Symposium, 326-327. (in Japanese)
- 4) Nam, Youngwook, Yasuhiro Arai, Takaharu Kunizane, Akira Koizumi, Daisuke Usukura and Yuki Isago. 2020. "A Study on the Accuracy of Discrimination Models Utilizing Actual Water Leakage Data." Reiwa 2nd JWVA Annual Conference and Symposium, 462-463. (in Japanese)
- 5) Shimada, Motochika, Yasuhiro Arai, Youngwook Nam, Takaharu Kunizane and Akira Koizumi. 2020. "A Study on the Necessary Number of Leakage Detection Sensors to be Installed in Water Pipes, Reiwa 2nd JWVA Annual Conference and Symposium, 464-465. (in Japanese)

【Publications】

- 1) NAM, Youngwook, Yasuhiro ARAI, Takaharu KUNIZANE and Akira KOIZUMI. 2020. "DEVELOPING OF WATER LEAKAGE DISCRIMINATION MODEL USING RECURRENCE PLOT AND CONVOLUTIONAL NEURAL NETWORK. Journal of JSCE, Ser.G (Environmental Systems Research Vol.48), II_273- II_284 . (In Japanese)
- 2) OKUYAMA, Ryohei, Yasuhiro ARAI and Katsuhide YOKOYAMA. 2020. "STATISTICAL ANALYSIS OF RISK FACTORS CAUSING SCUM GENERATION IN URBAN ESTURY. Journal of

JSCE, Ser.G (Environmental Research Vol.47),III_529-III_534. (In Japanese)

【External Funding Sources】

- 1)Japan Water Research Center, NewPipes Project (FY.2020-2022).
- 2)Kubota Co., Ltd .: Utilization of water quality monitoring data for water pipe networks and application of neural network models (2020-21).

【Social Contributions (Excluding confidential activities)】

- 1) Bureau of Waterworks Tokyo Metropolitan Government (TMWB)
- 2) Tokyo Metropolitan Government / Environmental Impact Assessment Council
- 3) Sagamihara City / Simple Water Supply Business Council
- 4) Akishima City / Public Facilities Comprehensive Management Plan Promotion Committee

【Awards】

Nothing in particular

【Other Activities】

Collaborative research with TMWB

- 1) "Study on the actual usage of domestic water focusing on changes in population structure and lifestyle." (2020-2022)
- 2) "Joint research on water distribution network pipeline renewal plan based on service life." (2020-2022)

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Tomoki Ishikura

【Position】 : Associate Professor

【Research Topic】 : Infrastructure Planning and Management

【Outline of research achievement】

- 1) The ash fall directly disrupts road transport network and indirectly influences to interregional commodity flow. This paper applies an integrated commodity flow model to assessment of economic and transport impacts caused by volcanic ash fall. We apply the model to the two active volcanos, Mt.Fuji and Mt.Asama, whose ash fall may affect to Kanto region. The results show changes in link flow, link cost, and O-D commodity flow quantitatively.

- 2) Ocean port is the crucially important infrastructure for Japan because more than 90 % of international tradable goods are imported and exported via port in terms of tonnage. This research developed a new policy assessment methodology to capture regional economic impact of port investment. The current methodology is based on spatial computable general equilibrium model, and explicitly treats route choice behavior for international trade and production activity of port service industry.

【Presentations】

- 1) Iso, Shogo, and Tomoki ISHIKURA : Impact Assessment on Transportation Network and Sectoral Freight Flow Caused by Volcanic Ash Fall, Proceedings of Infrastructure Planning 62, CD-ROM, November 2020, Online.

【Publications】

- 1) SEGI, S., YAMAZAKI, M., ISHIKURA, T., KOIKE, A., 2020. Consideration of modeling freight transportation cost in computable general equilibrium framework. *Journal of Japan Society of Civil Engineers, Ser. D3 (Infrastructure Planning and Management)* 76, 72–90.
https://doi.org/10.2208/jscejipm.76.2_72
- 2) YAMAZAKI, M., SEGI, S., ISHIKURA, T., KOIKE, A., 2020. A problem of sectoral classification in multi-sector sege model with iceberg transportation cost model. *Journal of Japan Society of Civil Engineers, Ser. D3 (Infrastructure Planning and Management)* 76, 91–99.
https://doi.org/10.2208/jscejipm.76.2_91
- 3) Ishikura, T.: Regional economic effects of transport infrastructure development featuring trade gateway region-asymmetric spatial CGE model approach, *Transportation Research Procedia* 48,

1750-1765 2020.

【External Funding Sources】

JSPS KAKENHI, Grant-in-Aid for Scientific Research (B), 19H02264, Principal Investigator, 2019-2021.

【Social Contributions (Excluding confidential activities)】

NA

【Awards】

NA

【Other Activities】

NA

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Atsushi Ueno

【Position】 : Associate Prof.

【Research Topic】 : Concrete and Concrete Making Materials

【Outline of research achievement】

1) A study on durability and skid resistance of eco-cement and recycled aggregate extremely dry concrete were conducted from the stand point of safety of pavement, conservation of natural resources and reducing of environmental impact by concrete structure. Also, deterioration factors and mechanisms on concrete surface in advanced water treatment system, influence of steam curing condition on properties of hardened concrete, effect of acceleration type chemical admixtures on setting and properties of mortar under various thermal condition, evaluation of properties of volcanic materials as concrete making materials, requirements for uniform dispersion of PP short fibers in concrete were examined as the basic properties for various type of concrete.

【Presentations】

- 1) Influence of absorption of volcanic fine aggregates on compressive strength of mortar, The 75th JSCE annual Meeting Proceedings, Sep./2020
- 2) Other 8 technical presentations on concrete

【Publications】

- 1) INFLUENCE OF FRESH MORTAR LAYER ON RELATIVE DENSITY DISTRIBUTION OF ACTUAL ROLLER COMPACTED CONCRETE PAVEMENT、Atsushi UENO, Masao ISHIDA, Takayuki FUMOTO, Kentaro OHNO and Kimitaka UJI、Advances in Construction Materials, Proceedings of the ConMat'20, 1-4_9.pdf, 2020.8
- 2) Technical committee on REASONABLE TEST METHOD FOR EVALUATION OF CONCRETE PERFORMANCES BASED ON THEIR PROPERTIES、Atsushi UENO, Yoshio UCHIDA, Shuzo OTSUKA, Madoka TANIGUCHI, Shigeyuki SOGO and Tokio KUROI、Advances in Construction Materials, Proceedings of the ConMat'20, 0-2_7.pdf, 2020.8
- 3) NUMERICAL STUDY ON THE CRACK DEPTH ESTIMATION IN CONCRETE BY IMPACT ELASTIC WAVE METHOD AND APERTURE SYNTHESIS TECHNIQUE、Kentaro OHNO、Atsushi UENO and Kimitaka UJI、Advances in Construction Materials, Proceedings of the ConMat'20, pp.1315-1324, 2020.8
- 4) Contribution of fly ash to the strength development of mortars cured at different temperatures、Yuko Ogawa (Hiroshima Univ.) , Kimitaka Uji, Atsushi Ueno and Kenji Kawai (Hiroshima Univ)、Construction and Building Materials, Vol.276, 122191, 2021.3
- 5) Other 6 technical papers and books

【External Funding Sources】

1) One funding support for basic study on acceleration curing of precast concrete.

【Social Contributions (Excluding confidential activities)】

1) 7 technical committees on JSCE

2) 4 technical committees on JCI (Japan Concrete Institute)

3) 2 technical committees on JCA (Japan Cement Association)

4) 1 technical committee on JSPS (Japan Society for the Promotion of Science)

【Awards】

1) 2 paper awards in the 75th annual conference of JSCE

【Other Activities】

1) Co-operation with Tokyo Metropolitan Gov.

2) Research work in Research center for volcanic hazards and their mitigation of TMU.

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Yoshiya ODA

【Position】 : Associate Professor

【Research Topic】 : Exploration Geophysics

【Outline of research achievement】

We, Exploration Geophysics Laboratory, focus on development of new analysis methods for exploration geophysics and its applications to civil engineering, earthquake engineering and volcanic engineering fields. The main research topics of this year are as follows: 1) Dense seismic observation and tomography analysis in Kozushima Island, Tokyo. 2) Crustal structure (velocity/attenuation) and surface displacement using InSAR analysis of Hachijojima Island. 3) Seismic phase detection using deep learning technology. 4) Research on subsurface structure, seismic hazard and seismic damage estimation in Zushi area. 5) Development of exploration method for concrete structures.

【Presentations】

- 1) Hiroyuki Azuma, Ryohei Tottori, Hikaru Kunimasa, Yoshiya Oda, Toshifumi Matsuoka, Detection of first arrival time of seismic wave with the Deep Learning, The 143th SEGJ Conference, Nov. 2019.
- 2) Wataru Uehara, Yoshiya Oda, A study on surface displacement and pressure source of Kozushima Island based on InSAR analysis, JpGU-AGU Joint Meeting 2020, SVC45-P19. (2020.05)
- 3) Keisuke Mizutani, Yoshiya Oda, Effects of Surface Geology on Seismic Motion of The 2011 Tohoku Earthquake in Monou-Cho, Ishinomaki, JpGU-AGU Joint Meeting 2020, HTT18-P05. (2020.5)
- 4) Ryohei Tottori, Hiroyuki Azuma, Yoshiya Oda, Toshifumi Matsuoka, Automatic Seismic Wave Detection with Deep Learning --Application to temporary observation data at Hachijojima Island-- JpGU-AGU Joint Meeting 2020, SVC45-P20. (2020.5)
- 5) Ryotaro Kanemaru, Yoshiya Oda, Hiroyuki Azuma, Kentaro Omori, Shotaro Kanke, Toshiki Watanabe, Temporary dense seismic observation in Hachijojima Island, JpGU-AGU Joint Meeting 2020, SVC45-P21. (2020.5)
- 6) Keitaro Fukushima, Kenta Iwasaki, Masaru Sakai, Yoshiya Oda, Yuji Onishi, Keisuke Koba, Genki Katata, Takashi Yamaguchi, Tomohiro Kubota, Hirohiko Nagano, Makoto Watanabe, Jun Koarashi, Nitrate contamination of mountainous headwater streams from adjacent agricultural and pasture lands beyond the watershed boundary in eastern Hokkaido, Japan, JpGU-AGU Joint Meeting 2020, 501604. (2020.5)
- 7) Masayuki Yamada, Yoshiya Oda, Hiroyuki Azuma, Koji Hada, Attenuation Characteristics of Major Active Faults by Twofold Spectral Ratio Method --Spacial Distribution of Attenuation--,

Institute of Social Safety Science Spring Meeting, A-4. (2020.5)

【Publications】

- 1) Tomoaki Shimizu, Hiroyuki Azuma, Yoshiya Oda, Detection of the end of the channel in improvement body after chemical grouting using electrical resistivity monitoring by the time-lapse analysis method, Journal of Japan Society of Civil Engineers, Ser. F1, 76, I_34-I_48.
- 2) Tomoaki Shimizu, Yoshiya Oda, Experimental verification of time-lapse analysis method in electrical resistivity tomography for the monitoring of chemical grouting, BUTURI-TANSA, 73, pp.192-208.
- 3) Yusuke Mimura, Takuya Ishizuka Yoshiya Oda, Kenji Kubota, Estimation of surface displacement around Kuju volcano before and after the 2016 Kumamoto earthquake using ALOS-2 data, BUTURI-TANSA, 73, pp.136-148.

【External Funding Sources】

- 1) Grant-in-Aid for Scientific Research(C): Co-Investigator, 2019-2021
- 2) Grant-in-Aid for Scientific Research(C): Co-Investigator, 2020-2022
- 3) MLIT: Principal Investigator, 2018-2020
- 4) Specified Donations

【Social Contributions (Excluding confidential activities)】

- 1) Board member: The Society of Exploration Geophysicist of Japan (Chair: Committee of international affairs)
- 2) Member: Committee on education of universities and graduate schools, Japan Society of Civil Engineering

【Awards】

Best paper award, Society of Exploration Geophysicist of Japan (Co-author)

【Other Activities】

Annual Report (English Version)

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Hiroshi SAKAI

【Position】 : Associate Professor

【Research Topic】 : Water and Wastewater Engineering, Water Environment Management, Water Quality Management

【Outline of research achievement】

Several studies were conducted for development and improvement for water and waste water treatment from environmental, social, and technological perspectives. Specific research area includes behavior of microplastics from tire wear particles, watershed forest management, water use at developing countries as well as degradation of pollutants by physical chemical treatment.

【Presentations】

No presentations at international conferences.

【Publications】

- 1) Shane Htet Ko and Hiroshi Sakai (2020) Water Treatment Practices in Rural Myanmar and Residents' Perceptions of Technologies from Donor Countries, Desalination and Water Treatment, 208, pp.337-344.
- 2) Hiroshi Sakai, HangXiang Song, Ryota Goto (2020) Degradation of Linear Alkyl Benzene Sulfonate by UV/H₂O₂ process, Ozone Science & Engineering, (accepted)

【External Funding Sources】

- JSPS Kakenhi, Development of water treatment technology with selectivity using sulfate radicals, PI, FY2019-2021
- Environment Research and Technology Development Fund, Spatio-temporal distribution of microplastics from tire wear particles and impact by traffic flow, PI, FY2020-2022
- Grant from Obayashi Foundation, Development of soft and hard measures against PPCPs in traditional water treatment where no water infrastructure covers, FY2020-2021
- Collaborative research with Tokyo Metropolitan Waterworks, Contribution by watershed forest on sediment deposition at Ogouchi Reservoir, Co-investigator, FY2020

【Social Contributions (Excluding confidential activities)】

Member of IWA (International Water Association), ACS (American Chemical Society)

【Awards】

None

【Other Activities】

None

Annual Report (English Version)

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Tetsuya Shintani

【Position】 : Associate Professor

【Research Topic】 : Coastal engineering, Hydraulics

【Outline of research achievement】

- 1) We have been developing a three-dimensional hydrodynamic simulator and the simulator was extended to incorporate spatiotemporally variable weather forcing in this year. This extension realizes accurate representation of wind stress and heat flux across the water surface in lakes and coastal waters.
- 2) We investigated the topics of internal wave breaking, vegetation dynamics, and wind-induced thermal stratification response using field data and numerical methods. From these investigations, we have published 8 peer-reviewed papers including 4 international journals.

【Presentations】

【Publications】

- (1) Thermal stratification responses of a monomictic reservoir under different seasons and operation schemes, Duca A. M., Shintani, T. and Yokoyama, K., Science of The Total Environment, 2020.
- (2) Integration of Submerged Aquatic Vegetation Motion Within Hydrodynamic Models, Nakayama, K., Shintani, T. and others, Water Resource Research, 2020.
- (3) Breaking of Internal Kelvin Waves Shoaling on a Slope, Nakayama, K., Sato, T., Tani, K., Borgman, L. Fujita, I. and Shintani, T. Journal of Geophysical Research, 2020.
- (4) Effect of pycnocline thickness on internal solitary wave breaking over a slope, Nakayama, K. Iwata, R. Shintani, T. Ocean Engineering, DOI:10.1016/j.oceaneng.2021.108884, 2021.

【External Funding Sources】

【Social Contributions (Excluding confidential activities)】

【Awards】

【Other Activities】

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Hitoshi NAKAMURA

【Position】 : Associate Professor

【Research Topic】 : Structural Engineering, Bridge Engineering, Engineering of Hybrid Structures

【Outline of research achievement】

Aiming primarily at bridges and steel structures in infrastructures, the survey, research and development have been performed as follows:

- (1) Study on material and structural properties of GFRP members
- (2) Development of trussed inspection path for bridges using pultruded GFRP members
- (3) Study on enhancement of fatigue durability for welded joints using externally-bonded CFRP
- (4) Seismic retrofitting of circular steel bridge piers by externally bonded carbon fiber sheets
- (5) Development of repair and strengthening method for steel structures using VaRTM technique
- (6) Evaluation of fatigue durability and debonding in adhesively bonded joints
- (7) Investigation research on history of material, structure and design for bridges, and evaluation as modern cultural heritages in civil engineering

As a result, the fundamental data and valuable information for rational design, construction and maintenance in infrastructures have been obtained.

【Presentations】

- 1) Shingo Iwashita, Hitoshi Nakamura, Kuniei Nogami: Trial design and economical efficiency of super long multi-span suspension bridge with center span length of 3000m, Proc. of the 75th Annual Conference of JSCE, I-204, 2pages, Sept. 2020. (Online) [in Japanese]
- 2) Takaya Imai, Thay Visal, Hitoshi Nakamura, Takashi Kamijo, Akihumi Kobayashi, Shuichi Hirano, Tetsuo Masakado, Hiroyuki Suzuki, Kenta Nakagawa: Effect of adhesive thickness and bonded length of CFRP plate on compressive strength of vertical stiffener with sectional loss, Proc. of the 75th Annual Conference of JSCE, I-398, 2pages, Sept. 2020. (Online) [in Japanese]
- 3) Takaya Imai, Visal Thay, Hitoshi Nakamura, Takashi Kamijo, Akifumi Kobayashi, Syuichi Hirano, Tetsuo Masakado, Hiroyuki Suzuki, Kenta Nakagawa: Study on rational repair of steel girder end with sectional loss by externally bonded CFRP plate, Proc. of the 75th Annual Conference of JSCE, I-399, 2pages, Sept. 2020. (Online) [in Japanese]
- 4) Takashi Kamijo, Kobayashi Akifumi, Shuichi Hirano, Takaya Imai, Hitoshi Nakamura, Tetsuo Masakado, Hiroyuki Suzuki, Kenta Nakagawa: Load-bearing behavior of steel I-girder bridge reinforced with CFRP plate at the end of girder with section loss, Proc. of the 75th Annual Conference of JSCE, I-400, 2pages, Sept. 2020. (Online) [in Japanese]
- 5) Takahiro Matsui, Daisuke Furuta, Thay Visal, Hitoshi Nakamura: The Basic Study for the Strengthening Effect of the End of the Steel Girder with the CFRP Stiffener, Proc. of the 75th Annual Conference of JSCE, I-401,

2pages, Sept. 2020. (Online) [in Japanese]

- 6) Yujiro Nishioka, Hitoshi Nakamura, Takehiko Tsubokawa, Takahiro Matsui: Study on recovery of bending strength of steel members with welded stiffeners and sectional loss by externally bonded CFRP and improvement of debonding strength, Proc. of the 75th Annual Conference of JSCE, I-402, 2pages, Sept. 2020. (Online) [in Japanese]
- 7) Visal Thay, Takumi Ozawa, Hitoshi Nakamura, Takahiro Matsui: Enhancement of fatigue durability in cruciform welded joints by carbon fiber sheets using VaRTM technique, Proc. of the 75th Annual Conference of JSCE, CS2-22, 2pages, Sept. 2020. (Online)
- 8) Nhut Viet Phan, Yukihiko Matsumoto, Takahiro Matsui, Hitoshi Nakamura: Investigation of effects of the angles of carbon fibers for the strengthening of thin-walled cylinders under compressive loads, Proc. of the 75th Annual Conference of JSCE, CS2-25, 2pages, Sept. 2020. (Online)
- 9) Koji Tsujimoto, Hitoshi Nakamura: Study on flexural characteristics and load carrying capacity of integrated molding sandwich panel slab, Proc. of the 75th Annual Conference of JSCE, CS6-06, 2pages, Sept. 2020. (Online) [in Japanese]
- 10) Daisuke Motoyoshi, Mutsumi Miyagawa, Hitoshi Nakamura, Yukio Miyashita: Basic Study on Stress Analysis and Resilience Enhancement using Mechanoluminescence, The Society for Mathematical Sciences, Proceedings of the 39th Symposium on the Society for Mathematical Sciences, Sept. 2020. (Online) [in Japanese]
- 11) Hajime Ishibiki, Mutsumi Miyagawa, Takuo Suzuki, Hitoshi Nakamura: Basic study on the improvement of bearing force of shear strength for the absorbed energy, The Society for Mathematical Sciences, Proceedings of the 39th Symposium on the Society for Mathematical Sciences, Sept. 2020. (Online) [in Japanese]
- 12) Ryu Nakazawa, Mutsumi Miyagawa, Hitoshi Nakamura, Takanibu Tamiya: Verification experiment for stress reduction using piezoelectric actuator, The Society for Mathematical Sciences, Proceedings of the 39th Symposium on the Society for Mathematical Sciences, Sept. 2020. (Online) [in Japanese]

【Publications】

- 1) Koji Tsujimoto, Yuanbin Wang, Hitoshi Nakamura: Applicability of GFRP inspection passage with integrated molding sandwich panel slab to actual structures, Journal of Japan Society of Civil Engineers, Ser. A1 (Structural Engineering & Earthquake Engineering (SE/EE)), Vol.76, No.5, JSCE Journal of Hybrid Structures, Vol.7, pp.II_84-II_94, May 2020. [in Japanese]
- 2) Daisuke Motoyoshi, Mutsumi Miyagawa, Hitoshi Nakamura, Yukio Miyashita: Basic study on stress analysis and resilience enhancement using mechanoluminescence, 5th International Conference of Science of Technology Innovation 2020, Nagaoka University of Technology, Oct. 2020.
- 3) Hajime Ishibiki, Mutsumi Miyagawa, Hitoshi Nakamura, Takuo Suzuki: Basic study on the improvement of bearing force of shear strength for the absorbed energy, 5th International Conference of Science of Technology Innovation 2020, Nagaoka University of Technology, Oct. 2020.
- 4) Ryu Nakazawa, Mutsumi Miyagawa, Takanibu Tamiya, Hitoshi Nakamura: Verification experiment for relaxation of stress system using piezoelectric actuator, 5th International Conference of Science of Technology

Innovation 2020, Nagaoka University of Technology, Oct. 2020.

- 5) Kim Oliver U. Magtagñob, Visal Thay, Hitoshi Nakamura, Takahiro Matsui: Analytical study on elasto-plastic seismic behavior of circular steel bridge pier retrofitted by externally bonded carbon fiber sheets, JSCE, Proc. of the 8th Symposium on FRP Hybrid Structures and Bridges, pp.52-61, Nov. 2020.
- 6) Yoko Kawashima, Visal Thay, Hitoshi Nakamura, Itaru Nishizaki: Experimental study on creep characteristics of adhesive joints under flexural loading, JSCE, Proc. of the 8th Symposium on FRP Hybrid Structures and Bridges, pp.95-101, Nov. 2020. [in Japanese]
- 7) Daichi Nii, Kunitaro Hashimoto, Hitoshi Nakamura: Experimental study on shearing behavior of GFRP materials, JSCE, Proc. of the 8th Symposium on FRP Hybrid Structures and Bridges, p.110-118, Nov. 2020. [in Japanese]
- 8) Koji Tsujimoto, Visal Thay, Hitoshi Nakamura: Experimental study on flexural characteristics of integrated molding sandwich panel slab, JSCE, Proc. of the 8th Symposium on FRP Hybrid Structures and Bridges, pp.135-142, Nov. 2020. [in Japanese]
- 9) Yujiro Nishioka, Visal Thay, Hitoshi Nakamura, Takehiko Tsubokawa, Takahiro Matsui: Study on bending strength of steel members with sectional loss in welded joints to stiffeners by externally bonded CFRP, JSCE, Proc. of the 8th Symposium on FRP Hybrid Structures and Bridges, pp.158-167, Nov. 2020. [in Japanese]

【External Funding Sources】

- JSPS KAKENHI, Grant Number: 21K04238, Investigator, Development of advanced strengthening technique for steel structures using externally bonded FRP members, 2021-2023.

【Social Contributions (Excluding confidential activities)】

- JSCE Committee of Hybrid structure, Member and Secretary
- JSCE Committee of Hybrid structure, Subcommittee on Continuing education in hybrid structures, Chair
- JSCE Committee of Hybrid structure, Subcommittee on Guidelines for performance-based design of hybrid structures, Member
- JSCE Committee of Hybrid structure, Subcommittee on evaluation of green and gray infrastructures, Member
- JSCE Committee of Hybrid structure, Subcommittee on Design and maintenance of FRP composite structures, Member and Secretary
- JSCE Committee of Structural engineering, Member
- JSCE Committee of Structural engineering, Subcommittee on Continuing Education, Chair
- JSCE Committee of Structural engineering, Editorial board on journal of structural engineering, Member
- JSCE Committee of Steel structures, Member
- JSCE Committee of Steel structures, Research committee on Update and utilization of database of historical steel bridges, Chair
- JSCE Committee on the History of civil engineering, Subcommittee on Historical and cultural value of post-war Infrastructures, Member
- JSSC Subcommittee on future strategy of steel structures, Chair

- Japan Steel Bridge Engineering Association, Research Group on Design method of steel bridges considering maintenance, Chair
- FRP Hydraulic Gates Engineering Association, Advisor
- The Japan Reinforced Plastics Society, Director

【Awards】

- (1) JSCE, the 8th Symposium on FRP Hybrid Structures and Bridges, Excellent Presentation Award
Koji Tsujimoto, Visal Thay, Hitoshi Nakamura: Experimental study on flexural characteristics of integrated molding sandwich panel slab, JSCE, Proc. of the 8th Symposium on FRP Hybrid Structures and Bridges, pp.135-142, Nov. 2020. [in Japanese]
- (2) JSCE, the 75th Annual Conference of JSCE, Excellent Paper Award
Yujiro Nishioka, Hitoshi Nakamura, Takehiko Tsubokawa, Takahiro Matsui: Study on recovery of bending strength of steel members with welded stiffeners and sectional loss by externally bonded CFRP and improvement of debonding strength, Proc. of the 75th Annual Conference of JSCE, I-402, 2pages, Sept. 2020. (Online) [in Japanese]

【Other Activities】

- (1) Hitoshi Nakamura: Civil Engineering Works - Bridges, Britannica International Yearbook 2019, Britannica Japan Co., Ltd., pp.225-226, April 2020. [in Japanese]
- (2) Hitoshi Nakamura: R & D of Bridge Inspection Path using GFRP Trussed Girder and Perspectives, Reinforced Plastics, Special edition of construction field, Vol.66, No.5, pp.205-211, May 2020. [in Japanese]
- (3) Hitoshi Nakamura and Kuniei Nogami: Theory and Practice of Non-linear Analysis, Vol.8, Basis and Application of Finite Element Method for Structural Engineering, Textbook for Lecture, JSCE Committee of Structural Engineering, Subcommittee on Continuing Education, pp.203-229, Feb. 2021. [in Japanese]
- (4) Hitoshi Nakamura: Introduction of R&D and application of FRP to infrastructures, Japan Reinforced Plastics Society, FRP online seminar, March 2021. [in Japanese]

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Mitsutoshi YOSHIMINE

【Position】 : Associate Professor

【Research Topic】 : Soil Mechanics, Geotechnical Engineering

【Outline of research achievement】

- 1) Shear test results under various magnitude of intermediate principal stress on material which had multiple weak planes were simulated using the proposed failure criterion to validate the failure model.
- 2) The effects of particle breakage, particle shape and fines contents as well as compression coefficient, maximum and minimum densities on liquefaction characteristics of sand are examined based on experimental data.
- 3) Simple shear tests were conducted and behavior of sand under large deformation up to steady state was observed. The simple shear behavior was compared with the test results under triaxial compression and extension conditions.
- 4) The method for evaluating the density of the specimen in the shear box tests which has large non-uniformity. The methodology was verified by measurement of the density from the image of X-ray CT scanner.

【Presentations】

- 1) Analysis of failure of anisotropic material with weak plain, YOKOYA Haruaki, YOSHIMINE Mitsutoshi, The 17th Conference of Kanto Branch of The Japanese Geotechnical Society (Geo-Kanto2020), Materials 1-3, 2020.
- 2) Undrained shear behavior of sands with various fines content, WANG Zhaocheng, YOSHIMINE Mitsutoshi, The 17th Conference of Kanto Branch of The Japanese Geotechnical Society (Geo-Kanto2020), Materials 3-4, 2020.
- 3) Steady state of sands under triaxial compression triaxial extension and simple shear conditions, KANOMATA Yosinori, YOSHIMINE Mitsutoshi, The 17th Conference of Kanto Branch of The Japanese Geotechnical Society (Geo-Kanto2020), Materials 3-6, 2020.
- 4) Steady state of sands evaluated by triaxial extension test, TSUTIYA Mizuki, YOSHIMINE Mitsutoshi, The 17th Conference of Kanto Branch of The Japanese Geotechnical Society (Geo-Kanto2020), Materials 3-7, 2020.
- 5) 砂 Effects of fines contents on the maximum and minimum densities of sands, NAKANISHI Mayu, WANG Zhaocheng, YOSHIMINE Mitsutoshi, The 17th Conference of Kanto Branch of The Japanese Geotechnical Society (Geo-Kanto2020), Materials 4-6, 2020.
- 6) Steady state of sands with various diameters of particles measured by direct shear box tests

under constant volume condition, HANDA Shinji, YOSHIMINE Mitsutoshi, The 17th Conference of Kanto Branch of The Japanese Geotechnical Society (Geo-Kanto2020), Materials 4-9, 2020.

- 7) Dimension and density of shear band in direct shear box test on sands with various particle diameter, Yuuya Takasugi, Mitutoshi Yoshimine, The 75th JSCE Annual Meeting, III-61, 2020.
- 8) Steady state of sands in triaxial compression, extension and simple shear conditions, The 55th Japan National Conference on Geotechnical Engineering of The Japanese Geotechnical Society, pp., July. 2020

【External Funding Sources】

JSPS KAKENHI Grant-in-Aid for Scientific Research (C), Principal Investigator: YOSHIMINE Mitsutoshi, FY2018 - 2020

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Hideo

【Position】 : : Assistant Professor

【Research Topic】 : : Hydrology, River Engineering

【Outline of research achievement】

Impervious areas such as buildings and roads, and permeable areas such as parks and green spaces are distributed complicatedly in urban watershed. In the low-impact development of urban areas, storm runoff control drainage systems combining landdrainage channels and rainwater regulating ponds are developed to reduce the load on rainwater runoff. In order to confirm the effect of storm runoff control drainage system, a method for modeling a detailed rainwater runoff process using urban landscape GIS data that can faithfully represent a complicated urban structure. In this study, we constructed a urban landscape GIS considering the rainwater runoff control drainage system in Augustenborg area, and showed the effects of green roof and runoff control type open channel by simulation.

【Presentations】

- 1) Thao Thi Phuong Bui, Akira Kawamura, Hideo Amaguchi, Duong Du Bui, Jean Margaret Mercado
Simulation of suspended sediment concentration at upper Srepok river basin in Vietnam using HYPE model.
Proc. of the 48th Kanto Branch Annual Conference of JSCE,

【Publications】

- 1) Mercado, J.M.R., Kawamura, A and Amaguchi, H. (May 2020)
Interrelationships of the barriers to integrated flood risk management adaptation in Metro Manila, Philippines.
International Journal of Disaster Risk Reduction, Vol.49, online; doi:10.1016/j.ijdr.2020.101683.
- 2) Padiyedath, S.G., Kawamura, A., Amaguchi, H., Takasaki, T. and Azhikodan, G. (June 2020)
A generalized storage function model for the water level estimation using rating curve relationship.
Water Resources Management, Vol.34, Issue 8, pp.2603-2619; doi:10.1007/s11269-020-02585-6.
- 3) Mercado, J.M.R., Kawamura, A, Amaguchi, H. and Prudencio-Rubio, C.J.C. (September 2020)
Multi-criteria monitoring & evaluation analysis of integrated flood risk management in Metro Manila.
Journal of Japan Society of Civil Engineers, Ser.G (Environmental Research), Vol.76, No.5, pp.I_269-I_276.
- 4) Amaguchi, H. and Kawamura, A. (September 2020)
A proposal of urban storm runoff model considering green infrastructures and its application.
Journal of Japan Society of Civil Engineers, Ser.G (Environmental Research), Vol.76, No.5, pp.I_319-I_325.
- 5) Fujizuka, S., Kawamura, A., Amaguchi, H. and Takasaki, T. (September 2020)
Emulation Evaluation of Urban runoff model by deep learning for the virtual hydrograph with observation noise.
Journal of Japan Society of Civil Engineers, Ser.G (Environmental Research), Vol.76, No.5, pp.I_383-I_391.

- 6) Fujizuka, S., Kawamura, A., Amaguchi, H. and Takasaki, T. (November 2020)
Rainfall runoff benchmark test by deep learning model using urban medium and small river basin dataset.
Journal of Japan Society of Civil Engineers, Ser.B1 (Hydraulic Engineering), Vol.76, No.2, pp.I_355-I_360.
- 7) Mercado, J.M.R., Kawamura, A., Amaguchi, H. and Prudencio-Rubio, C.J.C. (November 2020)
Fuzzy-based M&E of the IFRM performance in Metro Manila.
Journal of Japan Society of Civil Engineers, Ser.B1 (Hydraulic Engineering), Vol.76, No.2, pp.I_685-I_690.

【External Funding Sources】

“Study on urban storm runoff and inundation model using urban landscape GIS delineation technique” Principal Investigator, Grant-in-Aid for Scientific Research (C), 2019-2021.

【Social Contributions (Excluding confidential activities)】

【Awards】

【Other Activities】

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Kentaro OHNO

【Position】 : Assistant Professor

【Research Topic】 : Concrete Structure, Maintenance and Non-destructive Testing for Existing Concrete Structures

【Outline of research achievement】

I worked on the following subject by using elastic wave method.

- (1) Estimation of demolding strength of early age concrete by ultrasonic and impact elastic wave method
- (2) Stress estimation in prestressed concrete by ultrasonic
- (3) Estimation of crack depth by impact elastic wave method
- (4) Detection method of horizontal crack in RC slab by means of impact elastic wave
- (5) Estimation of adhesion condition between concrete and steel bar by using impact elastic wave method

【Presentations】

- 1) Takumi Mizutani, Atsushi UENO, Kimitaka UJI and Kentaro OHNO : Effect of water absorption in fine aggregate from volcanic sedimentation on compressive strength in mortar, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-27, 2020. Sep.[in Japanese]
- 2) Motoki ABE, Atsushi UENO, Kimitaka UJI and Kentaro OHNO : Basic study on properties of polypropylene fibers and its dispersion in cement paste, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-249, 2020. Sep.[in Japanese]
- 3) Ryota TANI, Kimitaka UJI, Atsushi UENO and Kentaro OHNO : Effect of mixture proportion of concrete on material segregation resistance of concrete and fluidity between rebars, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-281, 2020. Sep.[in Japanese]
- 4) Akihiro NAGATA, Kentaro OHNO, Atsushi UENO and Kimitaka UJI : Effect of coarse aggregate on the relation between compressive stress of concrete and ultrasonic velocity variation, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-368, 2020. Sep.[in Japanese]
- 5) Koichi SATO, Kentaro OHNO, Atsushi UENO, Kimitaka UJI, Satoshi IWANO, Shigeto KATAOKA, Nobuyasu TATSUZAWA and Shin SAWAGAMI : Application of aperture synthesis method for maintenance of newly constructed concrete structure by impact elastic wave method, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-370, 2020. Sep.[in Japanese]
- 6) Sho HAGIWARA, Kentaro OHNO, Kimitaka UJI and Atsushi UENO : Basic Study on horizontal

crack detection in RC slab by combination of impact elastic wave method and aperture synthesis method, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-371, 2020. Sep.[in Japanese]

7) Akari KAWASE, Kentaro OHNO, Atsushi UENO, Kimitaka UJI, Noriyuki UTAGAWA and Shinya KITAGAWA : Effect of various factors on concrete member thickness by ultrasonic transverse wave tomography method, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-372, 2020. Sep.[in Japanese]

8) Hana SUZUKI, Kimitaka UJI, Atsushi UENO and Kentaro OHNO : Effects of primer and sectional dimension on shear adhesion properties between existing concrete and repair mortar, Proceedings of the 75th Annual Conference of the Japan Society of Civil Engineers, V-402, 2020. Sep.[in Japanese]

9) Narumi SHIDA, Kentaro OHNO, Shinya UCHIDA, Masakazu HARUHATA and Satoshi IWANO : Detection method for adhesion loss between fire-damaged concrete and steel bar based on elastic wave propagation path model, Proceedings of JSNDI autumn Conference, 2020. Oct.[in Japanese]

10) Shinya UCHIDA, Masakazu HARUHATA, Satoshi IWANO, Kentaro OHNO, Genki KUBO and Hajime ITO : Influence of water discharge for fire-damaged concrete on detection values of rebound number, mechanical impedance, contact time and ratio of rebound number, Proceedings of JSNDI autumn Conference, 2020. Oct.[in Japanese]

11) Satoshi IWANO, Shinya UCHIDA, Masakazu HARUHATA, Kentaro OHNO and Shigeto KATAOKA : Influence of water discharge for fire-damaged concrete on results of contact time test, Proceedings of JSNDI autumn Conference, 2020. Oct.[in Japanese]

12) Masakazu HARUHATA, Shinya UCHIDA, Satoshi IWANO, Kentaro OHNO, Genki KUBO and Kenichi IKEDA : Influence of water discharge for fire-damaged concrete on color measurement of surface concrete, Proceedings of JSNDI autumn Conference, 2020. Oct.[in Japanese]

13) Kentaro OHNO, Narumi SHIDA, Shinya UCHIDA and Masakazu HARUHATA : Damage area estimation method in fire-damaged concrete by elastic wave method, Proceedings of JSNDI AE branch meeting, 2020. Dec.[in Japanese]

【Publications】

1) Kakeru ISHIGAKI, Kentaro OHNO, Kimitaka UJI and Atsushi UENO : Durability evaluation method for repairing mortar for concrete wall in bioactivated carbon adsorption pool, Proceedings of the Japan Concrete Institute, Vol.42, No.1, pp.515-520, 2020.6

2) Akihiro NAGATA, Kentaro OHNO, Kazukiyo TAMAKI and Yuji NONAMI : Time history of ultrasonic velocity variation in prestressed concrete and its influence factors, Proceedings of the Japan Concrete Institute, Vol.42, No.1, pp.1606-1611, 2020.6

3) Kentaro OHNO, Sho HAGIWARA, Atsushi UENO and Kimitaka UJI : Proposal of horizontal crack detection method in RC slab by combination of impact elastic wave method and aperture synthesis method, Proceedings of the Japan Concrete Institute, Vol.42, No.1, pp.1624-1629, 2020.6

- 4) Narumi SHIDA, Kentaro OHNO, Shinya UCHIDA and Masakazu HARUHATA : Estimation method for adhesion loss on interface between reinforcement and fire-damaged concrete based on elastic wave velocity, Proceedings of the Japan Concrete Institute, Vol.42, No.1, pp.1678-1683, 2020.6
- 5) Atsushi UENO, Masao ISHIDA, Takayuki FUMOTO, Kentaro OHNO and Kimitaka UJI : INFLUENCE OF FRESH MORTAR LAYER ON RELATIVE DENSITY DISTRIBUTION OF ACTUAL ROLLER COMPACTED CONCRETE PAVEMENT, Advances in Construction Materials, Proceedings of the ConMat'20, pp.174-182, 2020.8
- 6) Kentaro OHNO, Atsushi UENO and Kimitaka UJI : NUMERICAL STUDY ON THE CRACK DEPTH ESTIMATION IN CONCRETE BY IMPACT ELASTIC WAVE METHOD AND APERTURE SYNTHESIS TECHNIQUE, Advances in Construction Materials, Proceedings of the ConMat'20, pp.1315-1324, 2020.8

【External Funding Sources】

- Collaborative research : 3
- Commissioned research : 1
- Public recruitment research : 2

【Social Contributions (Excluding confidential activities)】

- Japan Society of Civil Engineering : 1 committee
- Japan Concrete Institute : 4 committees
- Architectural Institute of Japan : 1 committee
- The Japanese Society for Non-Destructive Inspection : 7 committees

【Awards】

- Excellence presentation award from Japan Society of Civil Engineers, “Effect of water absorption in fine aggregate from volcanic sedimentation on compressive strength in mortar”
- Excellence presentation award from Japan Society of Civil Engineers, “Application of aperture synthesis method for maintenance of newly constructed concrete structure by impact elastic wave method”

【Other Activities】

- Collaborative research with bureau of Construction Tokyo Metropolitan Government

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Yusuke KISHI

【Position】 : Assistant Professor

【Research Topic】 : Structural Engineering, Disaster Mitigation, Seismic Engineering

【Outline of research achievement】

- 1) Research on Coupled Buckling Strength Evaluation for Compression Member of Steel Bridges.
In order to investigate the performance of evaluate the coupled buckling strength of H and I type cross-section members, calculation method of major design codes were surveyed. In addition, actual results of cross section for steel truss bridges were also surveyed, and distribution of the section parameters were analyzed.
- 2) Numerical Simulations of Crowd Evacuation during Volcanic Disaster
Simple numerical simulations were carried out, in order to verify the crowd evacuation on Izu Oshima island of Tokyo Prefecture. As the result of the simulation, complete evacuation time for all evacuees in target area was calculated.

【Presentations】

- 1) Ryotaro Ishikawa, Jun Murakoshi, Yusuke Kishi : Estimation of stress state on existing steel I-girder bridges loading F load, Proc. of the 75th Annual Conference of JSCE, I-70, September, 2020. (in Japanese)
- 2) Kyosuke Yamamoto, Jun Murakoshi, Yusuke Kishi: Numerical study on stress state of upper edge of vertical stiffener between main girder and lateral girder of steel I-girder bridges Proc. of the 75th Annual Conference of JSCE, I-71, September, 2020. (in Japanese)
- 3) Kanto Ishikawa, Jun Murakoshi, Kuniei Nogami, Yusuke Kishi: Numerical study on behavior of girder-end of steel I-girder bridge under lateral load, Proc. of the 75th Annual Conference of JSCE, I-112, September, 2020. (in Japanese)
- 4) Ziping Huang, Jun Murakoshi, Kuniei Nogami, Yusuke Kishi: Numerical study on compressive strength of main member of truss bridges with uniform local section loss, Proc. of the 75th Annual Conference of JSCE, I-122, September, 2020. (in Japanese)
- 5) Yushi Harano, Jun Murakoshi, Minoru Takahashi, Kuniei Nogami, Yasushi Josen, Yusuke Kishi: Numerical study on compressive strength of gusset plate connections with various plates thickness, Proc. of the 75th Annual Conference of JSCE, I-125, September, 2020. (in Japanese)
- 6) Tomoki Katayama, Jun Murakoshi, Kuniei Nogami, Yusuke Kishi: Numerical study on damaging mechanism for girder end of steel I-girder bridges during lateral load of earthquake, Proc. of the 48th Kanto Region Annual Conference of JSCE, I-57, March, 2021. (in Japanese)

【Publications】

- 1) Jun Murakoshi, Ryotaro Ishikawa, Yasushi Josen, Mamoru Sawada, Yusuke Kishi : Consideration on fatigue durability of welded joints of existing I-girder highway bridges, Journal of Structural Engineering, Vol. 66A, pp. 576-585, Japan Society of Civil Engineers, April 2020. (in Japanese)
- 2) Ziping Huang, Jun Murakoshi, Kuniei Nogami, Yusuke Kishi: Numerical study on compressive strength of box section with uniform local section loss, 28th JSSC Proc. of Constructional Steel, November, 2020. (in Japanese)

【External Funding Sources】

Fundamental study on structural engineering, Research Donations for Steel structures, The Japan Iron and Steel Federation, 2020.

【Social Contributions (Excluding confidential activities)】

- 1) Subcommittee on survey and research for seismic performance verification of steel bridges using high-precision numerical analysis method, Committee on Steel Structure, Japan Society of Civil Engineers.
- 2) Subcommittee on survey and research for utilization of steel properties, Committee on Steel Structure, Japan Society of Civil Engineers.
- 3) Subcommittee for Standard Specifications for Steel and Composite Structure, Committee on Steel Structure, Japan Society of Civil Engineers.
- 4) Subcommittee of Editorial Secretary on Journal of Structural Engineering, Committee on Structural Engineering, Japan Society of Civil Engineers.
- 5) Subcommittee of Young Structural Engineers, Committee on Structural Engineering, Japan Society of Civil Engineers.
- 6) 2020 Annual Conference Program Organization Division I, General Affairs Department, Japan Society of Civil Engineers.
- 7) Subcommittee on Rationalization Design, Committee on Strengthening and Life Elongation Research for Steel Bridges, Japan Society of Steel Construction.

【Awards】

None

【Other Activities】

Research Member of Research Center for Volcanic Hazards and Their Mitigation, Tokyo Metropolitan University.

【Department】 : Department of Civil and Environmental Engineering, Faculty of Urban Environmental Sciences

【Name】 : Masami Yanagihara

【Position】 : Assistant professor

【Research Topic】 : Traffic flow, Driving behavior, Traffic micro simulation, Public transportation

【Outline of research achievement】

- 1) In order to understand the driving behavior of the driver, by organizing the literature about the driving behavior, behavior related to stop acceleration and deceleration of the driver and the literature on the reaction of the driver to external stimuli. The traffic simulation and the experiment using the driving simulator were conducted and the results were analyzed. In particular, we analyzed the stress index considering the passage of time using biological reaction data of the experiment using the driving simulator, and performed a detailed analysis of the results of traffic simulation and deep learning.
- 2) In order to understand the utility of resting behavior at the roadside station, Michi-no-eki, during long-distance trips, we estimated the parameters based on the facility selection behavior system of each trip and the Web questionnaire.

【Presentations】

- 1) Study on time changes and factors of driver's stress index while changing lanes, Masami Yanagihara, Haruna Kondo, Oneyama Hiroyuki, Research Meeting on Civil Engineering Planning, Vol.62, 2020, 11
- 2) Construction of rest function verification method for facilities along general roads based on WEB questionnaire, Wataro Yamashita, Masami Yanagihara, Oneyama Hiroyuki, Research Meeting on Civil Engineering Planning, Vol.62, 2020, 11
- 3) Analysis of stop-by behavior at rest facilities for passenger vehicles, Oneyama Hiroyuki, Masami Yanagihara, Research Meeting on Civil Engineering Planning, Vol.62, 2020, 11
- 4) Analysis of break-oriented behavior along general roadsides based on WEB questionnaire, Wataro Yamashita, Oneyama Hiroyuki, Masami Yanagihara, Research Meeting on Civil Engineering Planning, vol.61, 2020, 6
- 5) Probabilistic prediction model for occurrence of traffic congestion and accident on intercity expressway based on sensor data, Shohei Funahashi, Oneyama Hiroyuki, Masami Yanagihara, Takashi Yamamoto, Research Meeting on Civil Engineering Planning, vol.61, 2020, 6
- 6) Study on the effect of the installation position of the signal lamp on the right turn behavior, Hirotaka Ooki, Masami Yanagihara, Oneyama Hiroyuki, Annual Conference of Japan Society of Traffic Engineers, Vol.40, 393, 2020, 9

- 7) Impact of the Moving Light Guide System on traffic flow in a mixture of autonomous vehicle, Hiroaki Terada, Masami Yanagihara, Oneyama Hiroyuki, Annual Conference of Japan Society of Traffic Engineers, Vol.40, 519, 2020, 9
- 8) Analysis of changes in stress indicators over time due to lane changes, Haruna Kondo, Masami Yanagihara, Oneyama Hiroyuki, Taira Aikawa, The 75th Annual Meeting of JSCE, 2020, 9
- 9) Analysis of break-oriented behavior along general roadsides based on WEB questionnaire , Wataro Yamashita, Oneyama Hiroyuki, Masami Yanagihara, The 75th Annual Meeting of JSCE, 2020, 9

【Publications】

- 1) Study on real-scale experiments of driving behavior at signal change intervals related to the locations of traffic signal heads, Oneyama Hiroyuki, Satoshi Niikura, Masami Yanagihara, Takashi Oguchi, Seisan Kenkyu, Vol.72, No.3, pp.269-274, 2020
- 2) Analysis on Influence of Moving Light Guide System on Traffic Flow under Autonomous Vehicle, Hiroaki Terada, Masami Yanagihara, Oneyama Hiroyuki, JSTE Journal of Traffic Engineering, Vol.7, No.2, A_216-A_225, 2021
- 3) A Study on the Effect of the Lamp Position of Traffic Signal Lights on Right Turn Behavior, Hirotaka Ooki, Masami Yanagihara, Oneyama Hiroyuki, JSTE Journal of Traffic Engineering, Vol.7, No.2, pp.A_298-A_306, 2021

【External Funding Sources】

2019-2021, Optimization of traffic flow by intervention for autonomous vehicles, KAKENHI-PROJECT- 19H02268, Co-Investigator
2019-2021, New CART (Committee on Advanced Road Technology), Vol.36, “Technology research that contributes to improving the quality of road policies”, Co-Investigator
2020-2022, 5RF-2006, Environmental Restoration and Conservation Agency, ERCA

【Social Contributions (Excluding confidential activities)】

Member, Japan Society of Civil Engineers (JSCE)
Member, Japan Society of Traffic Engineers (JSTE)

【Awards】

【Other Activities】