

# Curriculum Vitae of Mitsuyoshi Akiyama

## 1. Personal Information

Born: June 17, 1971 (Married, One child; Japan Citizen)  
Language: Japanese and English  
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## 2. Education

B. Eng. in Civil Engineering Tohoku University, 1995  
M. Eng. in Civil Engineering Tohoku University, 1997  
Dr. Eng. in Civil Engineering Tohoku University, 2001

## 3. Work Experiences

1997 Apr.- Bridge Engineer at Nippon Koei Co., Ltd.  
1998 Apr.- Research Associate at Tohoku University  
2001 May- Assistant Professor at Tohoku University  
2004 Apr.- Associate Professor at Tohoku University  
(2008 Oct. to 2009 Sep. Visiting Scholar at Lehigh University, PA, USA)  
2011 Apr.-Present Full Professor at Waseda University  
(2018 Aug. to 2019 Sep. Visiting Scholar at Lehigh University, PA, USA)  
(2020 Feb. to Present Visiting Professor at National Taiwan University of Science and Technology, Taiwan)

## 4. Areas of expertise

- Multi-hazard design, analysis and considerations for bridges.
- Life-cycle risk assessment of a transportation network under multiple hazards
- Risk-based and resilience-based design methodology of bridge systems
- Innovations in earthquake resistant structures/ Seismic resilient structures
- Application of X-ray technology to bridge maintenance

## 5. Awards

- IABMAS (International Association for Bridge Maintenance and Safety) Junior Research Prize, 2016
- The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, 2008
- Japan Society of Civil Engineers Yoshida Award in 1998, 2007, and 2010
- Japan Society of Civil Engineers Encouragement Award for Outstanding Thesis in 2007
- Japan Concrete Institute Award for Engineering Development in 2001

## 6. Plenary and Keynote Lectures

- Akiyama, M.: Increasing the Resilience of highway bridges under multiple hazards including earthquake, tsunami, corrosion and climate change. Spring 2022 Fazlur R. Khan Distinguished Lecture Series, Bethlehem, USA, 2022 (Invited Lecture)
- Akiyama, M., Frangopol, D.M. and Ishibashi, H.: Reliability, risk and resilience of coastal infrastructure under seismic and tsunami hazards. ASCE/IRD UCLA Lifelines 2021-22 Conference, Los Angeles, USA, 2022. (Invited Lecture)
- Akiyama, M.: What can be done to enhance the resilience of structures and infrastructures in Japan before the anticipated Nankai Trough earthquake occurs? Inaugural Meeting of International Forum of Innovation Base of Earthquake Engineering Comprehensive Simulation & 1st International Forum on the Latest Development of Resilient City, Tianjin, China. 2022. (Invited Lecture)
- Akiyama, M. and Frangopol, D.M., 2019. Risk and Resilience of Civil Infrastructure Systems under Extreme Events. Proceedings of IABSE Symposium 2019, Guimaraes, Portugal. (Keynote Lecture)

- Akiyama, M. and Frangopol, D.M., 2018. Life-cycle reliability of bridges under independent and interacting hazards. Proceedings of 9th International Conference on Bridge Maintenance, Safety and Management (IABMAS2018), Melbourne, Australia. (Keynote Lecture)
- Akiyama, M., 2017: Lessons from recent major earthquakes in Japan: Emphasis on reliability assessment of structures under multiple hazards. 18th ASEP International Convention, Quezon, Philippine.
- Akiyama, M. and Frangopol, D.M., 2016. Probabilistic approach for road network retrofitting prioritization under seismic and tsunami hazards. Proceedings of 5th International Symposium on Reliability Engineering and Risk Management (ISRERM2016), Seoul, Korea.
- Akiyama, M. and Frangopol, D.M., 2014. Long term performance of concrete bridges under extreme events. Proceedings of 9th Austroads Bridge Conference, Sydney, New South Wales, Australia, 2014
- Akiyama, M. and Frangopol, D.M., 2013. Life-cycle reliability of concrete bridges under both extreme events and hazard associated with continuous deterioration, IStructE Conference on Structural Engineering in Hazard Mitigation 2013, Shanghai, China
- Akiyama, M. and Frangopol, D.M., 2013. Life-cycle design of bridges under multiple hazards: Earthquake, tsunami and continuous deterioration, 11th ICOSSAR (International Conference of Structural Safety and Reliability), New York, USA
- Akiyama, M. and Frangopol, D.M., 2012. Lessons from the 2011 Great East Japan Earthquake: Emphasis on life-cycle structural performance, IALCCE (International Symposium on Life-Cycle Civil Engineering), Vienna, Austria
- Akiyama, M. and Frangopol, D.M., 2010. On life-cycle reliability under earthquake excitations of corroded structures. IALCCE (International Symposium on Life-Cycle Civil Engineering) 2010, Taipei, Taiwan

## **7. Scientific Community Service Activities (at present)**

- Managing Editor of Structure and Infrastructure Engineering, Taylor & Francis, UK
- Associate Editor of the ASCE Journal of Bridge Engineering
- Editorial Board Member of Structural Safety and International Journal of Earthquake and Impact Engineering
- Member of Task Group 2 in SEI-ASCE Technical Council on Life-Cycle Performance, Safety, Reliability and Risk of Structural Systems
- Vice Chair of Commission 6 –Sustainability–, IABSE
- Member of IASSAR Technical Committees of TC4: Life-Cycle Performance, Cost and Optimization
- Member of fib TG5.14 Life Cycle Cost (LCC) - Design life and/or replacement cycle
- International Scientific Committee Member of IABMAS2022, and ICOSSAR2021.

## **8. Selected Journal Papers in the past five years**

Theme "To ensure reliability, minimize risk, and enhance resilience of structures and infrastructures under multiple hazards: Emphasis on earthquake and tsunami"

- Alhamid, A.K., Akiyama, M., Aoki, K., Koshimura, S. and Frangopol, D.M.: Stochastic renewal process model of time-variant tsunami hazard assessment under nonstationary effects of sea-level rise due to climate change, *Structural Safety*, 99: 102263, 2022.
- Alhamid, A.K., Akiyama, M., Ishibashi, H., Aoki, K., Koshimura, S. and Frangopol, D.M.: Framework for probabilistic tsunami hazard assessment considering the effects of sea level rise due to climate change, *Structural Safety*, 94: 102152, 2022.
- Ishibashi, H., Akiyama, M., Kojima, T., Aoki, K., Koshimura, S. and Frangopol, D.M.: Risk estimation of the disaster waste generated by both ground motion and tsunami due to the anticipated Nankai Trough earthquake, *Earthquake Engineering and Structural Dynamics*, 50: 2134-2155, 2021.
- Ishibashi, H., Akiyama, M., Frangopol, D.M., Koshimura, S., Kojima, T. and Nanami, K.: Framework for estimating the risk and resilience of road networks with bridges and

embankments under both seismic and tsunami hazards, *Structure and Infrastructure Engineering*, 17(4): 494-514, 2020.

- Akiyama, M., Frangopol, D.M., and Ishibashi, H.: Toward life-cycle reliability-, risk- and resilience-based design and assessment of bridges and bridge networks under independent and interacting hazards: emphasis on earthquake, tsunami and corrosion, *Structure and Infrastructure Engineering*, 16(1): 26-50, 2020.

Theme "Development of damage-free structures/ Development of resilient structures/ Novel earthquake-resistant structures/ Application of 3D printers/ Seismic issues"

- Ishibashi, H., Akiyama, M., Fujiwara, M., Uno, Y., and Hiromitsu, T.: Precast RC blocks with connections composed of steel shear keys and CFRP sheets for the superstructure of temporary bridges in the postdisaster situation, *ASCE Journal of Bridge Engineering*, 27(8): 04022061, 2022.
- Brito, M.B., Akiyama, M., Seto, T., Honda, R., and Ishigaki, N.: Shaking table test of a friction sliding system on a concrete member with variable curvature fabricated by a three-dimensional printer, *Journal of Earthquake Engineering*, 2021.
- Brito, M.B., Akiyama, M., Ichikawa, Y., Yamaguchi, H., Honda, R., and Ishigaki, N.: Bidirectional shaking table tests of a low-cost friction sliding system with flat-inclined surfaces. *Earthquake Engineering and Structural Dynamics*, 49: 817-837, 2020.
- Hasan, M.A., Akiyama, M., Kashiwagi, K., Kojima, K. and Peng, L.: Flexural behaviour of reinforced concrete beams repaired using a hybrid scheme with stainless steel rebars and CFRP sheets, *Construction and Building Materials*, 265: 120296, 2020.
- Brito, M.B., Ishibashi, H., and Akiyama, M.: Shaking table tests of a reinforced concrete bridge pier with a low-cost sliding pendulum system, *Earthquake Engineering and Structural Dynamics*, 48: 366-386, 2019.

Theme "Life-cycle performance assessment of deteriorating concrete structures using experimental evidence, probabilistic analysis and finite element method"

- Xin, J., Akiyama, M., Miyazato, S., Frangopol, D.M., Lim, S., Xu, Z., and Li, A.: Effects of galvanostatic and artificial chloride environment methods on the steel corrosion spatial variability and probabilistic flexural capacity of RC beams, *Structure and Infrastructure Engineering*, 18(10-11): 1506-1525, 2022.
- Srivaranun, S., Akiyama, M., Bocchini, P., Christou, V., Frangopol, D.M., Fukushima, H. and Masuda, K.: Effect of the interaction of corrosion pits among multiple tensile rebars on the reliability of RC structures: Experimental and numerical investigation, *Structural Safety*, 93: 102115, 2021.
- Zhang, M., Nishiya, N., Akiyama, M., Lim, S. and Masuda, K.: Effect of the correlation of steel corrosion in the transverse direction between tensile rebars on the structural performance of RC beams, *Construction and Building Materials*, 264: 120678, 2020.
- Hasan, M.A., Yan, K., Lim, S., Akiyama, M. and Frangopol, D.M.: LCC-based identification of geographical locations suitable for using stainless steel rebars in reinforced concrete girder bridges, *Structure and Infrastructure Engineering*, 16(9): 1201-1227, 2020.
- Zhang, M., Song, H., Lim, S., Akiyama, M., and Frangopol, D.M.: Reliability estimation of corroded RC structures based on spatial variability using experimental evidence, probabilistic analysis and finite element method, *Engineering Structures*, 192: 30-52, 2019.
- He, Z.S., Akiyama, M., He, C., Frangopol, D.M., and Liu, S.J.: Life-cycle reliability analysis of shield tunnels in coastal regions: emphasis on flexural performance of deteriorating segmental linings, *Structure and Infrastructure Engineering*, 15(2): 851-871, 2019.
- Yanweerasak, T., Pansuk, W., Akiyama, M. and Frangopol, D.M.: Life-cycle reliability assessment of reinforced concrete bridges under multiple hazards, *Structure and Infrastructure Engineering*, 14(7): 1011-1024, 2018.
- Lim, S., Akiyama, M., Frangopol, D.M. and Jiang, H.: Experimental investigation of the spatial variability of the steel weight loss and corrosion cracking of RC members: Novel X-ray and digital image processing techniques, *Structure and Infrastructure Engineering*,

13(1): 118-134, 2017.

Theme "For advancement of infrastructure's maintenance through integration of machine learning, numerical simulation, reliability analysis, and updating theory"

- Jia, S., Akiyama, M., Han, B., Xie, H., and Frangopol, D.M.: Structural identification via the inference of the stochastic volatility model conditioned on the time-dependent bridge deflection, *Structural Safety*, 100: 102279, 2023.
- Xin, J., Akiyama, M., Frangopol, D.M., and Zhang, M.: Multi-objective optimisation of in-service asphalt pavement maintenance schedule considering system reliability estimated via LSTM neural networks, *Structure and Infrastructure Engineering*, 18(7): 1002-1019, 2022.
- Supasit, S., Akiyama, M., Masuda, K., Frangopol, D.M., and Maruyama, O.: Random field-based reliability updating framework for existing RC structures incorporating the effect of spatial steel corrosion distribution, *Structure and Infrastructure Engineering*, 18(7): 967-982, 2022.
- Zhang, M., Akiyama, M., Shintani, M., Xin, J. and Frangopol, D.M.: Probabilistic estimation of flexural loading capacity of existing RC structures based on observational corrosion-induced crack width distribution using machine learning, *Structural Safety*, 91: 102098, 2021.
- Xin, M., Akiyama, M., Frangopol, D.M., Zhang, M., Pei, J., Zhang, J.: Reliability-based life-cycle cost design of asphalt pavement using artificial neural networks, *Structure and Infrastructure Engineering*, 17(6): 872-886, 2021.
- He, Z.S, Supasit, S., Akiyama, M. and Frangopol, D.M.: Life-cycle reliability-based design and reliability updating of reinforced concrete shield tunnels in coastal regions, *Structure and Infrastructure Engineering*, 16(4): 726-737, 2020.
- Akiyama, M., Frangopol, D.M. and Takenaka, K.: Reliability-based durability design and service life assessment of reinforced concrete deck slab of jetty structures, *Structure and Infrastructure Engineering*, 13(4), 468-477, 2017.

Theme "Structural performance assessment of steel fiber-reinforced concrete members/ Development of casting method for SFRC members"

- Raju, R.A., Akiyama, M., Lim, S., Kakegawa, T., Hosono, Y.: A novel casting procedure for SFRC piles without shear reinforcement using the centrifugal forming technique to manipulate the fiber orientation and distribution, *Construction and Building Materials*, 303: 124232, 2021.
- Li, Y., Ruan, X., Akiyama, M., Zhang, M., Xin, J., Lim, S.: Modelling method of fibre distribution in steel fibre reinforced concrete based on X-ray image recognition, *Composites Part B*, 223: 109124, 2021.
- Raju, R.A, Lim, S., Akiyama, M., and Kageyama, T.: Effects of concrete flow on the distribution and orientation of fibers and flexural behavior of steel fiber-reinforced self-compacting concrete beams, *Construction and Building Materials*, 262: 119963, 2020.
- Lim, S., Raju, R.A., Matsuda, M., Okamoto, T. and Akiyama, M.: Structural behavior prediction of SFRC beams by a novel integrated approach of X-ray imaging and finite element method, *Construction and Building Materials*, 170: 347-365, 2018.

As of December 14, 2022  
Mitsuyoshi Akiyama