



# PANEL DISCUSSION

at the JSCE 2023 Annual Meeting

**Let's Discuss the Philosophy of Civil Engineering Education!  
- For a Bountiful Society -**

by Education and Research Subcommittee in Concrete Committee

## The Subject of Panel Discussion

Education. There may be nothing more important than education for us to pass the baton of a generation to the next generation and continue developing for a bountiful society. Furthermore, when it comes to education in civil engineering, which is responsible for the creation of such a society, the importance of education is immeasurable. The Concrete Education Research Subcommittee (Chair: Akira Hosoda) has held a series of open roundtable discussions on YouTube to discuss the secret to motivate students, pioneering lecture methods, education for better maintenance management, engineers who can play an active role in the world, public relations for civil engineering that can attract many people, and so on. We have been discussing the following topics. Panelists will passionately discuss the philosophy of civil engineering education to realize a fertile society.

### Date and Time

Monday, September 11, 2023, 13:00-15:00 (Zoom Webinar)

### Chairperson

Prof. Akira Hosoda / Research Center for Sustainability,  
Resilience and Well-being, Yokohama National University

### Panelists

Dr. Shogo Matsunaga / Infrastructure Lab  
Dr. Yasushi Kamihigashi / Central Nippon Expressway Company Limited  
Dr. Naho Takeda / National Institute of Technology, Akashi College  
Dr. Nobuhiro Chijiwa / Tokyo Institute of Technology  
Dr. Kenzo Watanabe / KAJIMA CORPORATION  
Dr. Hiroshi Murata / TAISEI CORPORATION  
Dr. Kazuhiko Hayashi / National Institute of Technology, Kagawa College  
Prof. Kazuya Tamada / National Institute of Technology, Maizuru College  
Prof. Shinichi Miyazato / Kanazawa Institute of Technology

## Topics in the First Half

Topic Motivation and Pedagogy in Civil Engineering Education

Main Issues Education of Philosophy, Development of Coordination Ability, How Grading Should Be, Communication Between Teachers and Students, Continuous Growth of Teachers Themselves, and Actual Experience.

A discussion was held on the importance of philosophy education in civil engineering education, led by Chairperson Hosoda, Dr. Kamihigashi, Dr. Matsunaga, Prof. Tamada, and Prof. Miyazato. Some of the topics raised during the discussion are introduced below.

### Prof. Hosoda

I believe that modern people have become so mass-oriented that they are unable to find their own roles and missions within the community of society, and that they have become ephemeralists and have lost the meaning and purpose of life. In such a modern society, philosophical education is becoming more and more important.

### Dr. Kamihigashi

In fact, there are engineers in companies who are able to do the work they are taught, but are unable to deal with applied cases. I believe that this is due to a lack of understanding of the philosophy and essence of the engineers' work. For example, they need to understand that infrastructure development is not done for the sake of the company or the organization from a narrow perspective, but rather, considering the nature of civil engineering, the essence of civil engineering is for the benefit of the people. It is not for the sake of the organization but for the sake of the people.

### Dr. Matsunaga

I am concerned about the decline in the coordination skills of engineers. In civil engineering, there are a wide range of stakeholders. For example, in explaining a single construction project to the client, the government, local residents, and managers, the information required by each party is different, and engineers need to appropriately select or adjust the key points and terminology in their explanations accordingly. To do so, the engineer must understand the purpose of the construction project and the overall picture. Recently, however, there are many engineers who are not aware of this and give ad hoc explanations. I believe that one of the reasons for this decline in the coordination skills of engineers is that the division of labor in modern civil engineering makes it difficult to understand the overall picture of the construction project and hinders the understanding of the philosophy and essence of the project.



Photo Panelists of the First Half



Photo Panelists of the First Half

### Prof. Hosoda

In terms of coordination skills, I believe that the ability to coordinate interpersonal relationships should also be taught in school education. Not only in civil engineering, but also in any work or daily life, it is difficult to proceed alone, and cooperation with others is necessary. In a cooperative system, there are people of various backgrounds, and engineers need to be able to coordinate smoothly within such a community.

### Prof. Tamada

From a faculty member's point of view, we need to think about conveying not only philosophy, knowledge, and techniques, but also the underlying background, sense, and significance, and to do so, we need to continuously develop ourselves. Also, the chats in class seem to be very memorable for the students, and I think that what we talked about in the chats, the recommended books we introduced, etc., help the students to understand the philosophy.

### Prof. Miyazato

Colleges of technology and universities are not only educational institutions but also research institutions, so when I mix stories about research, experiments, and the field in class, students' eyes light up and they listen to what I have to say. Also, by taking students on field trips and giving them opportunities to communicate with engineers in the field, students learn what their predecessors did and for what purpose. This greatly helps students to understand the philosophy, essence, and purpose of civil engineering.

### Prof. Hosoda:

I think it is very important to know "what our predecessors did for a purpose. The history of civil engineering is the history of infrastructure development that our predecessors did their best to solve the problems that society was facing at that time, with the desire to "improve the country" and "enrich people's lives," and it is filled with a great deal of philosophy. It is important for today's students and engineers to learn about them, to live and synchronize with their predecessors, to replace them with the problems of today, and to have a sense of being a party to them. It is also very important to pass on to future generations what they themselves have done.

## Topics in the Second Half

Topic New Trials in Civil Engineering Education

Main Issues Balance between Cutting-Edge Technology and Basic Studies, Education Using Numerical Simulation, Cooperation with Other Fields in Education, Student-Centered Free Learning and Evaluation from Various Perspectives on the Results, Use of Problem-Solving Work in Small Groups.

Dr. Chijiwa, Dr. Murata, Dr. Hayashi, Dr. Watanabe and Dr. Takeda presented topics on new enforcement in civil engineering education. Some of the topics are introduced below.

### Presentation by Dr. Chijiwa

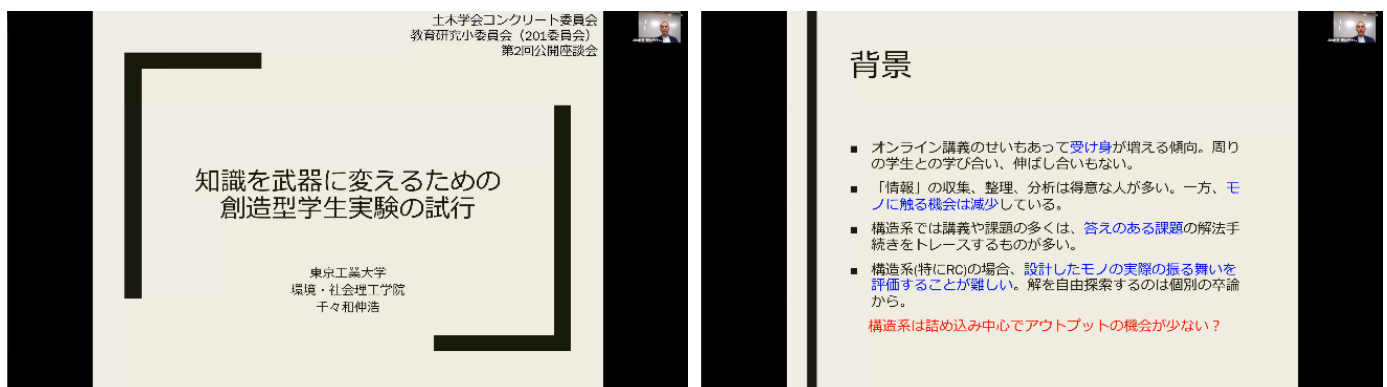
Dr. Chijiwa gave a presentation on "Trial of Creative Student Experiments to Turn Knowledge into an Advantage " and introduced the following.

#### [Background]

- Since Covid-19, online lectures have become more popular, and the trend toward passive learning has become stronger than ever. In addition, students are losing opportunities for friendly competition with other students.
- In many structural mechanics lectures and exercises, students are required to trace out the solution procedures for "problems that have an answer (one correct answer)."

#### [Details of the Initiative]

- We presented a familiar infrastructure problem as a "problem with no answer (more than one correct answer)," and conducted a creative experiment and competition for students to think about and verify solutions to the problem. As an example, students were given the theme of designing a bridge to improve travel from the university campus to the nearest train station, and were asked to propose a bridge that takes into account planning, structural performance, design, environmental impact, and cost.
- The students also use numerical simulation (FEM) to analyze the failure process of the proposed bridges to simulate how the bridges they have designed would fail. In infrastructure development, where "things are designed not to break," it is very important to know "how things break."
- We hope that this project will serve as an introduction for students to see how far they can go with what they have learned so far, and to move on to the next step.



Presentation

## Presentation by Dr. Murata

Dr. Murata gave a presentation on the topic of "Efforts to Educate Engineers Using Numerical Simulation Tools (Blind Analysis Contest of RC Beams)" and introduced the following contents.

### [Background]

- In recent years, an increasing number of people are joining the industry without having completed classroom lectures and experiments on concrete at university. (In some cases, concrete-related lectures, exercises, and experiments are not required as part of university graduation requirements.)

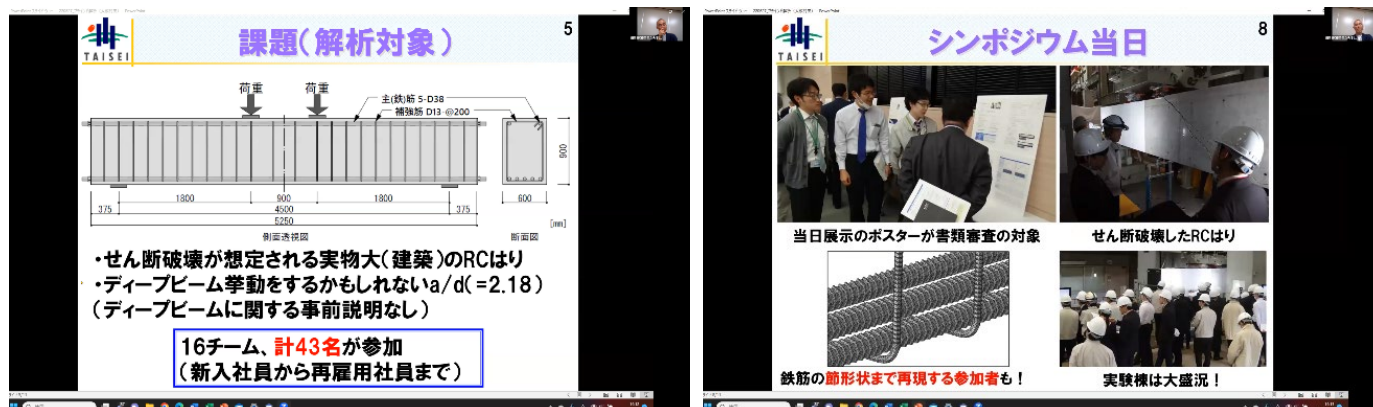
### [Details of the Initiative]

- As a part of in-house education, we held a contest that included blind analysis (FEM) of RC beams and loading experiments. A lecture on FEM was also given in advance of the contest.

The contest was a good opportunity for participants to share values and ideas from different fields and departments.

- The 43 participants from 16 teams were from different fields (civil engineering and architecture) and divisions (research and design), and the mixed teams provided a good opportunity to share values and perspectives from different fields and divisions.

- Generally, the construction industry in Japan is divided into the civil engineering field and the building field, but this initiative has strengthened the connection between the two within our company, which is of great value.



Presentation