# Interview with Tamon UEDA,
# President of Japan Society of Civil Engineers

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Speaker: Tamon UEDA,
President, Japan Society of Civil Engineers
Distinguished Professor, Shenzhen University (China)
Emeritus Professor, Hokkaido University (Japan)
Interviewer: Kohei NAGAI, The University of Tokyo

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Professor Tamon UEDA is a researcher who specializes in concrete engineering, and at present is President of the Japan Society of Civil Engineers. In this interview, President UEDA talks about the organization of the Japan Society of Civil Engineers, and his research and international activities carried out over many years.

The interview took place on November 21, 2022 at his home in Hokkaido (Japan).

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Prof. Tamon Ueda and Dr. Kohei Nagai

Prof. Tamon Ueda

## Organization of Japan Society of Civil Engineers

Nagai: Can you explain the organization of the Japan Society of Civil Engineers (JSCE)? In particular, you have been engaged in many activities overseas, so are there some activities that are characteristics of the JSCE compared with societies overseas, and if so can you please tell us?

Ueda: JSCE has nearly 40,000 members, and the members are drawn from industry, government, and academia. Of these, about 10% or 20% of the members are involved in the actual technical activities related to civil engineering in JSCE. Ranging from the extremely technical aspects and including also the soft technical aspects, we consider that being engaged in these activities is normal, but as of now I think that the only similar society in other countries is the Korean Society of Civil Engineers. Regarding the differences, in the JSCE many permanent committees are very active carrying out research activities, such as the Concrete Committee, etc. However, in the American Society of Civil Engineers (ASCE) and the Institution of Civil Engineers in the UK, there are almost none of such activities. Instead, they have activities directly related to society. For example, they hold various courses, and at present webinars and seminars, etc. Another characteristic is that they work together with government in various ways, actively providing advice. Recently I attended the Annual Membership Meeting of the ASCE, and what many people there, including the President, emphasized was the advice given to the US Government on how much money had to be invested in American infrastructure, based on the ASCE Report Card for American infrastructure. This has had a major impact on the present Biden Administration infrastructure budget, and it was emphasized that this was because of what the ASCE had done, so I think the society works very hard on those kinds of activities.

Another difference is that the JSCE covers all fields of civil engineering. Other societies of civil engineers do not necessarily do this, for example, Indonesian Association of Civil and Structural Engineers does not deal with the water field.

There are many civil engineering societies overseas that only deal with limited fields within civil engineering, such as structural and geotechnical fields. Also, one other difference is in the civil engineering societies of China and Vietnam, although they have the organization of a civil engineering society, actually they are closer to the federation of engineering societies that we have in Japan. Therefore below them are societies that actually carry out the activities, in the form of a unified federation. If you ask what activities the China Civil Engineering Society (CCES) does, the answer is probably there are no activities as the CCES, but below it the affiliated organizations like special interest groups such as concrete/prestressed concrete, bridge engineering, etc., carry out various activities.

There are many similar societies, but they are probably more like what we refer to as research committees in JSCE. The research committees in JSCE are properly organized, but overseas such as in Vietnam, they are small societies. One other difference is that there are many countries with no civil engineering society. That is probably the most common case. Therefore in many cases it is an engineering society that appears as a counterpart. So, in many ways, JSCE differs from the societies in other countries, and in particular I think that we are a very unique but comprehensive society.

Nagai: What are your views on the good features of the JSCE organizational structure and method of operation, and what do you think needs to be improved?

Ueda: As you know there are various forms in other countries, but I think there should be an organization like JSCE. This also has significance for civil engineering, as civil engineering is a very general field of study, it brings together people from various fields, performing

various activities with common tasks and objectives. An organization for performing these activities is necessary as a characteristic of civil engineering. In countries with no civil engineering society, there are cases where they must create another method for performing the activities, and these are probably public government organizations. Therefore, from this point of view the JSCE is very valuable, and I think its value, its rare value, should be utilized in the future as a strength. If this situation was not just in Japan but worldwide, various countries would come together and work on specific activities, then the strength of civil engineering societies would be exhibited, because it is the only type of organization capable of accomplishing this.

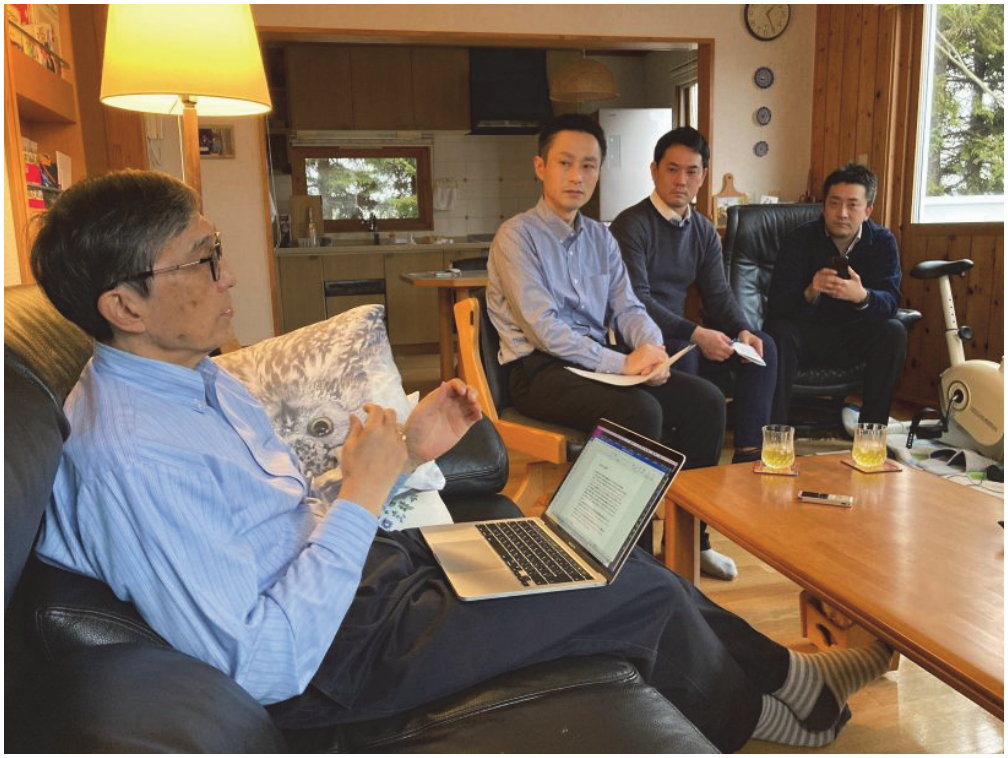
Nagai: In the case of international contribution or international development, we have disasters that are a worldwide problem, and more recently carbon neutrality is being discussed. These are issues that are not limited to Japan and should be on a worldwide scale, also many problems arise that will not be resolved if they are not discussed with the rest of the world. How do you think civil engineering societies should deal with these issues?

Ueda: Because of the global scale, these issues must be tackled together with other countries. JSCE has established an International Chapter, and as the international section, there is a constant flow of international activities.

This flow includes the concept of Official Development Assistance (ODA). Therefore when Japanese civil engineering technology is required, or when human resources are required, we extend a hand to these other countries saying we can do this, we can provide or cooperate, and this was one-sided in a certain sense. In the future, I think a one-sided approach will not be very effective for solving global issues. Again, we will be working together and cooperating. Without the concept of working together or collaborating, many things will not be possible in the future. In my opinion, we have not had such a concept to date. Every five years JSCE produces a medium-term plan, and this concept finally arrived in the plan for 2020 to 2024 that we are implementing now. One of the items in the plan is international activities, and the concept of collaboration rather than the one-sided cooperation, has been introduced into international activities. Previously we did not have this. This direction will become necessary for JSCE in the future, and it is being gradually implemented.

Nagai: So civil engineering societies are a forum for further utilization of the strength that various fields co-exist?

Ueda: For example, there are many things that cannot be done unless several societies work together. At present issues arise where people from multiple fields must work together, such as countermeasures against flooding. Therefore instead of the approach of having separate societies work on the issues, I think an existing civil engineering society organization can be the interface, or the civil engineering society can always and continuously play the role of providing opportunities and fora for such discussions.



## Research into Concrete Technology

Nagai: Next, I would like to ask about research into concrete. In particular, you are a pioneer in research into strengthening materials using Fiber Reinforced Plastics (FRP), and you are recognized as a distinguished researcher in this field throughout the world. Can you tell us about this, including the history of this research? Can you tell us how your involvement in FRP research began, and how the activities increased, from a historical perspective?

Ueda: It is not that I selected FRP research by myself, but rather that happened to be the time when FRP research started in Japan as a whole. I started this research on the advice of Professor Okamura of the University of Tokyo. However, besides this, almost all the influential professors were doing something related to FRP. It also happened that at that time I was thinking I should find a new research theme for the future, so I started to become involved with it.

This was in the early 1990s, a short while before the Great Hanshin-Awaji earthquake. When the Great Hanshin-Awaji earthquake occurred, seismic retrofit became necessary, and this further accelerated the research. Initially, research into FRP began as research into an alternative material to steel reinforcement. Then the Great Hanshin-Awaji earthquake occurred and seismic retrofit became necessary in all of Japan, so interest arose in FRP as a seismic retrofit material, and this further accelerated the research.

Nagai: When you were starting the research, for a smooth start, were Japanese materials manufacturers producing these materials, or was it a trend throughout the world?

Ueda: I think there was a trend throughout the world. There were researchers from overseas that came and stayed in Japan, and research was conducted in various countries throughout the world. Research was carried out in China, and also in Europe. It was at that time that international conferences on FRP research began.

Nagai: Was it the occurrence of earthquakes that accelerated the pace of the research?

Ueda: Yes, that was the case in Japan. Therefore instead of research into an alternative material to steel reinforcement, research into strengthening methods, such as adhesion methods, etc., increased.

Nagai: At that time it was as a result of society's needs that research progressed so well, and besides you, were there many other researchers who were engaged on FRP strengthening research?

Ueda: Many people were involved in such research, and so we really led the world in the 1990s. That was also the case in the early 2000s.

Nagai: At that time did you feel that we must be doing this research in parallel with actual strengthening construction, or implement the technology in society, and afterward produce design standards, or should we be doing everything in parallel?

Ueda: Yes, research results regarding seismic strengthening were actually used as they were. Therefore methods of using carbon fibers and aramid fibers were developed separately as actual construction methods and used. They were first applied to railway structures. Thereafter they were applied to road structures and were rapidly adopted.

Nagai: During all this time you were very involved in international activities, and I think the results of your activities and the results of your researches spread internationally, or spread automatically. In this case did your international network spread easily?

Ueda: At that time I was simultaneously involved in the Model Code for Concrete Structures, and the overseas network from that work was separate from the network I formed from the FRP research. However, in the 1990s I was working hard on FRP research, and at that time the U.S.A. was number one internationally. The U.S.A. produced a newsletter “FRP International”, and Japan contributed a considerable amount to this newsletter.

Japan contributed to various activities. Therefore it was natural that Japan was the leader, what was done in Japan spread to the world, many Japanese made presentations at international conferences, so naturally information that originated in Japan spread to the world at that time.

Nagai: At that time, what professors besides you were active internationally?

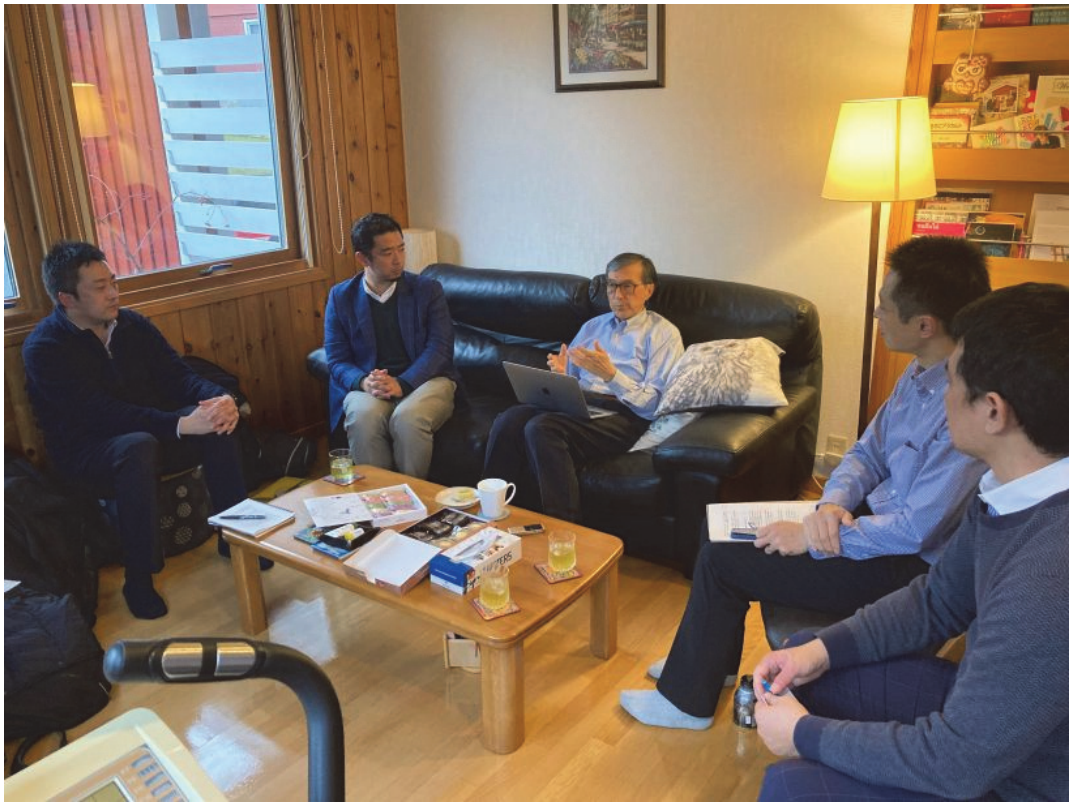
Ueda: The most active was probably Professor Mutsuyoshi. Professor Mutsuyoshi was particularly active in research into FRP tensioning materials. However, besides that, he was also involved with various researches into FRP, just as I was.

Nagai: At that time I think you had particularly strong connections with industry?

Ueda: Of course. I had connections to the companies that manufactured the FRP materials, with the companies that developed their construction methods, and I worked with their people.

Nagai: A particularly good result of these activities was that awareness of your research spread internationally.

Ueda: Exactly. I think that was a good result. That was then, but even now FRP research is continuing in other places throughout the world, but at present there are few researchers in Japan working hard in this field.



## International Activities

Nagai: You have been actively engaged in international activities and exchange, during which time you must have met outstanding international students and been involved in activities that other Japanese professors have not experienced. Can you tell us about how you started to be involved with international activities and what activities you were most involved with, in contrast to other Japanese professors?

Ueda: In the beginning, after completing my doctorate, I spent two years in the USA at the University of Washington. After returning to Japan, I spent about three years at The University of Tokyo, and thereafter I spent three years in Bangkok, Thailand teaching at the Asian Institute of Technology (AIT). This was not because I really wanted to go overseas. Somehow I was never the one to take the initiative, but going to the University of Washington, the U.S.A, was on the recommendation of Professor Okamura, and going to Bangkok Thailand was on the recommendation of Professor Nishino. I did not have any strong feelings about what I wanted to do overseas, and strange to say, I was passive about it. Another of my character traits is that I always want to undertake something new. I am not the type that continues to do the same thing for a long period of time, so if there is a chance for something new, I take it. It just happened that the new opportunities for me were overseas. Giving such overseas opportunities was an idea of the senior professors back in our time. The professors probably thought that I should be given an opportunity overseas and so I was given the opportunities, but it was not because I was an overseas type.

The first time I worked jointly with foreigners was on the Asian Concrete Model Code. I should tell you how that began. It was probably Professor Okamura's suggestion, but it started with the idea that young researchers working on concrete from the other main universities in Japan of about the same age group as I should get together periodically for free discussion on what each would like to do. This began in the early '90s. What emerged from the discussion among the gathered researchers was the suggestion that it would be good to have an Asian Concrete Model Code. Professor Mutsuyoshi probably brought this idea.

The Japan Concrete Institute (JCI) established a research committee, and when they looked into whether engineers/researchers in Asia wanted an Asian Concrete Model Code, it became clear that most countries wanted it, and then the activities began.

The Asian Concrete Model Code was published after 10 years of activities. During that time we would meet up with the Asian committee members twice a year to discuss various matters to produce this one document. This was like producing the Japanese Standard Specifications for Concrete Structures starting from zero, but by working together with the Asian committee members we achieved it. We started using the personnel networks that we already had, but through these activities we became friends with those that we had discussions with, and I still maintain contact with the people in various countries. Some joint research is also being conducted, and even now when there is something we want to do with a specific country or one of their universities, we can utilize these advantages.

One other network is international students. This includes students that have come to my university, students at AIT, students at The University of Tokyo, and Hokkaido University has started a program in the English language, so it includes the students that have come there. Fortunately, as is generally recognized, the quality of most of the international students is high, and the quality of their research is high. Most of them return to their university or their country, or go to another country, etc., and there become members of university staff, so in many cases we have various and continuous joint research with them. I think that the networks that I have created are the basis for various activities that I am now involved with.

Nagai: While these activities were expanding, there must have been many aspects where it was not simple to continue. I think most of your research was not pure research, so can you tell us about your motivation for continuing, and what were the pleasures you found in the activities.

Ueda: First was the Asian Concrete Model Code, but after that, the establishment of the Asian Concrete Federation (ACF), which was one of my initiatives that was taken up, was proceeding to develop into the next stage. In such an initiative the people that had an interest in it participated, and they were the leaders in the concrete field of each country. Then international conferences were periodically held, and whenever there was an event the networks created included the leaders of the field in each country, such as Thailand, Korea, China, Malaysia, etc., and whenever we wanted something to be done, we would always use those networks.

Those with whom I did joint research were mostly my former students. We would spontaneously agree to do joint research. I think in most cases it was a proposal from their side, rather than a proposal from me. Usually, research was agreed and papers were produced, it seemed so normal and effortless.

Nagai: For such joint research to occur, doesn't it normally takes a lot of time, and various processes are necessary, such as international association activities?

Ueda: The prerequisites in terms of results for such activities to proceed smoothly are first of all that students whom I have been advising return to their own countries, and become university professors there. That is why I think it is necessary to have good students and build good relationships with these students, then naturally this joint research can occur.

Nagai: Are these international activities enjoyable, and do they have advantages? I guess one's outlook is widened by international activities more than domestic activities, the number of acquaintances increases, and you get to know about various things?

Ueda: These are all factors. However, the other party does not need to be overseas. It is the same if the other party is in a Japanese university. The reason that overseas is better is that there is a feeling of travel when overseas, more than in Japan, and as a result there is a feeling of a difference compared with Japan.

Nagai: Regarding research level, there has been a major change in Asia in the past 30 years compared with Japan. Has there also been a change in those you have associated with over this time?

Ueda: It is difficult to answer that. When I was at AIT my research collaborators were students, and there was no difference compared with how I collaborated with Japanese students for research, it was the same. I think there was not much difference. However, apart from AIT, in the 80s and 90s when I was at AIT, at for example Chulalongkorn University, the number one university in Thailand, there were not many professors doing research. At that time there was not much talk of joint research. This was because they were not ready for it. It was in the 21st century when I started a program for international students at Hokkaido University, and at that time the main universities in Asia were conducting real research, so naturally we started joint research, which had benefits for both sides.