JSCE Japan Society of Civil Engineers
International Activities Committee
International News
NO.2 August 1999

A Greeting from the New Chair of International Activities Committee:

On behalf of the International Activities Committee (IAC) and taking this opportunity of the second issue of IAC's Newsletter of 1999, it is my great pleasure to introduce the readers major activities of Japan Society of Civil Engineers (JSCE), in particular, those of IAC. JSCE is now headed by a new President, Dr. Hajime OKAMURA who is one of the professors emeritus of Tokyo University and also currently acts as the Vice President of Kochi University of Technology.

JSCE is widely open, to be responsible for the consolidation of infrastructures, to increase / multiply their values, and to maintain them effectively. Our websit is also open to effectively communicate among not only all of the Society's members but also with the general public. One of our activities relating to public relations is to host "Civil-Engineering Day" on November 18th every year, which gives general public an opportunity to participate and understand our civil engineering activities through various demonstrations. Here is a small quiz that you may be interested in. Do you know why the Xociety specified November 18th as the Civil Engineering Day of JSCE? Because the Japanese word "Civil" can be decomposed into the Chinese numeric characters of "eleven" and "eighteen."

Under the leadership of new JSCE President, we would like to promote international activities more aggressively. Following are some of the highlights sponsored by JSCE and IAC in 1999.

The Society hosts a nation-wide Annual Conference at different places every year. The Conference used to gather more than 6,000 civil engineers to present or exchange their interesting research outcomes. This year, we will meet at Hiroshima University. The details of the Conference program is presented at the English website of JSCE. Since last year, the Conference is providing some research presentations in English and is organizing a forum in English to discuss the specific topics relating to international issues.

I would also like to introduce that IAC hosted a Summer Symposium on August 6th 1999 with the active participation of foreign students who are currently studying in Japan. The detailed report of this event is introduced in this Newsletter.

As you may know, JSCE is one of the founders of the Civil Engineering Conference of Asian Region (CECAR) together with societies of Philippines (PICE) and USA (ASCE). JSCE will host the 2nd CECAR in Tokyo in April 2001. Please keep your eyes on the forthcoming announcements on this important event. In addition, JSCE has so far entered into agreements withtwelve other societies overseas, such as ASCE, ICE, etc., as shown later.

I believe that the ongoing globalization toward 21st century definately requires mutual understanding and cooperation among civil engineers in the world, for which this JSCE Newsletter assists you to understand the new orientation of JSCE.

JSCE 54th Annual Conference Offers Two Programs in English

The above Conference will be held on the Hiroshima University Campus and the International Conference Center Hiroshima from 22 to 24 September 1999. It will provide many events and programs. Among others, two particular programs will be attractive for non-Japanese speakers because these will be conducted in English.

The first is a panel discussion on "Technical Cooperation in Asia and the Role of Japan" chaired by the former President of JSCE, Dr. Hiroshi Okada. The objective of this panel is to discuss how Japanese civil engineers should cope with the emerging issues in globalization, particularly in Asia. With this aim in mind, there are many pending issues to be discussed in the proposed panael including: effective technology transfer based on the Japanese experience in its modernization process including infrastructure planning and management; development of technical standards and design codes in the Asian developing countries; mutual certification of qualified engineers; business opportunities, challenges and the competitiveness of Japanese construction industry; and many other matters. This panel discussion will be held on 22 September from 13:30 to 15:30 at K108 Room of the Faculty of Integrated Arts and Sciences Building.

The second prgram to be conducted in English is one of the Common Session Programs (CS-5) under the Academic Research Presentations, which will be held on 24 September in Room 219 of the Faculty of Engineering Building. This full-day presentation in Engish comprises three main topis, namely "Researches Related to Reduction of Construction Cost and Low-Cost Construction Projects" under which 9 articles will be presented, and "Case

Presentations of Overseas Construction Projects" under which 10 overseas projects are discussed.

The two specific programs above welcome participation of non-Japanese speakers as well as Japanese interested in these exciting topics in civil engineering.

Agreement of Cooperation with European Council of Civil Engineers

JSCE and European Council of Civil Engineers (ECCE) signed an agreement of cooperation at the office of ECCE in the Institution of Civil Egineers, London, on January 25, 1999. The agreement of cooperation was officially approved at the recent ECCE council meeting in Dublin in May this year. This was the 11th Agreement of Cooperation which has provided JSCE a strong network of 27 civil engineering related societies and institutions throughout Europe, consisting of more than 200 thousands professional civil engineers.

ECCE was created in 1985 out of the common concern of the professional bodies for civil engineers in Europe that the civil engineers working together across Europe could offer much more to assist Europe advance its built environment and protect the natural environment.

Attendees at the signing ceremony from ECCE were the President, Dr. Antonio Adao da Fonseca, Secretary General, Mr. John Whitwell and Deputy Secretary General of International Activities Committee, Dr. Kusakabe and four other JSCE overseas members. They discussed the issues of current common interest, mainly professional qualifications, accreditation of engineering education, and global / regional technical standards. JSCE and ECCE also shared the mutual recognition that Asia is the most promising and biggest market for construction industry in the next century, and ECCE showed keen interest in the second International Civil Engineering Conference in the Asian Region to be held in Tokyo in April 2001.

JSCE Establishes a Cooperative Network with PRC

JSCE President Dr. Okada signed an Agreement of Cooperation with the China Civil Engineering Society (CCES) in Beijing on May 12, 1999. JSCE now holds Agreements with 12 overseas societies.

CCES is a nationwide organization that was founded in 1912 and has a membership of over 90,000. It has 12 sub-associations and 50 professional committees, which are directly affiliated to the Society. It has established its local organizations in 30 provinces over China.

The signing ceremony was held in the conference room of the Ministry of Construction gathereing five delegates from each society. Dr. Okada said, "JSCE is determined to put forth further efforts for internationalization of the Society and this agreement is an important step forward. Especially in engineering, there is no national border." Mr. Yao Bing, Vice President of CCES said, "It is easy to put the signature on the Agreement, but it is difficult to put it in practice."

After top representatives of JSCE and CCES explained their international activities, a good deal of time was spent on searching ways to cooperate. When Dr. Okada spoke about the 2nd Civil Engineering Conference in Asian Region scheduled to be held in Tokyo in April 2001, Mr. Yao showed a great interest in the Conference an dexpressed himelf strongly on inviting 3rd Conference to China.

Progress in Preparation for the Second Civil Engineering Conference in Asian Region

After a series of meetings between ASCE, PICE and JSCE from March to June this year, the preparation for the Second Civil Engineering Conference in the Asian Region (2nd CECAR) is now under way. The local organizing committee chaired by Dr. Sumiyoshi, seconded by Secretary General, Dr. Terashi has been working on a detailed plan for the 2nd CECAR, coordinating and integrating suggestions from a great number of technical committees of ASCE, PICE and JSCE. Although the final selection of the conference venue and the conference date is the matter of the Steering Committee to decide, the tentative plan at present is that the 2nd CECAR is to be held at Hotel Metropolitan, Tokyo, from April 17 to 18, in 2001.

To ensure the continuity of CECAR, ASCE, PICE and JSCE have agreed to create a non-prifit organization that is proposed to be called the Asian Civil Engineering Coordinating Council (ACECC). The purpose of ACECC shall be to schedule Asian Forums where worldwide members of the civil engineering profession may jointly develop programs of coordination and mutual action in designated matters affecting the interest of civil engineers and related professions. A letter of invitation to joing ACECC has been recetnly sent to the Agreeement of Cooperation societies.

The First International Summer Symposium for Foreign Students in Japan

Despite the large number of overseas students studying civil engineering in Japan, few forums exist for meeting and exchanging views. JSCE is therefore taking steps to internationalize its activities in order to develop mutual understanding between the engineers of Japan and other nations. JSCE recognizes overseas students and engineers in Japan and other nations. JSCE recognizes overseas students and engineers in Japan as a valuable resource with whom opinions and ideas can be shared to strengthen core knolwdge in civil engineerg. In an effort to foster international communication, JSCE has initiated an International Summer Symposium series, the first of which was held at JSCE Headquarters in Tokyo on August 6, 1999.

The symposium was conducted entirely in English, and overseas students studying civil engineering were encouraged to participate. The subjects of the summer symposium covered seven areas in civil engineerg: I) structural mechanics and earthquake engineering, II) hydraulics, III) geotechnical engineering, IV) urban planning and transportation, V) materials, VI) consturction management and infrastructure system, and VII) environment.

The emphasis of this seminar is put more on providing opportunitites for getting to know eachother and fostereing fellowship than on the presentation of academic thesis. The first seminar received participation from 92 overseas students and 25 Japanese members, and turned out a great success.

JSCE plans to hold the summer symposium annually, and will continue to strive to facilitate the exchange of information and help to maintain participants' ties with Japan after they return to their native countries.

Two Years' Challenges under Transformation by Yumio ISHII, Past Chair of IAC

During my tenure of the Chair of the International Acitivites Committee (IAC) in the past two years, JSCE has seen the true beginning of our internationalization. It has been my pleasure and honor to have engaged in challenging international activities of JSCE.

Japan currently faces its third great upheaval in the modern age. The first began with the Meiji Restoration of 1868 and was characterized by the opening of the country to the outside world, civilization and enlightenment, and nation's wealth with strong military. The second started with defeat in the war in 1945. It ushered in an era of peace and saw Japan join the ranks of the democratice nations of the world. The third, which is taking place now, is the decisive globalization of industry and culture. JSCE is also undergoing this transformation in response to a pressing need of internationalization.

The "JSCE 2000" of 1997 formulated a strategy for internationalization comprising the following key actions:

- Increase the number of Agreements of Cooperation with overseas societies
- Disseminate information internationally
- Establish overseas branches
- Strengthen exchanges with overseas societies at the society level
- Cooperate with overseas societies for mutual recognition of engineers' qualifications

Along the above strategy, there has been substantial progress in the past two years.

The first International Civil Engineering Conference in the Asian Region was successfully held in 1998 in Manilla. As a member of the Steering Committee, I was chosen to help run the conference as technical track chair. The conference also held an Englishlanguage essay contest, the finalists of which made oral presentations. It was most encouraging for us that both finalists from Japan were women sho gabe remarkable presentations. This first Conference is being followed up by the establishment of the Asian Civil Engineering Coordinating council among the civil engineers societies of Japan, the US, and the Philippines (JSCE, ASCE, PICE), which is open to the world. The 2nd Civil Engineering Conference in the Asian Region is to be held in Tokyo in April 2001.

The 1998 JSCE Annual Conference held in Kobe conducted English-language sessions, which was well appreciated by the participants and representatives from the US and the Philippines. It is my pleasure that this innovative arrangement isto be expanded in the forthcoming JSCE Annual Confdrence in Hiroshima in September 1999.

New Agreements of Cooperation have been signed with those societies in Mexico, China and the EU, bringing the total to 12. Other Agreements of Cooperation are also being pursued.

The first issue of Newsletter in English has been published in February 1999, and the JSCE English website is now on line.

While being the Chair of IAC, I participated twice in the ASCE Round Table in 1997 and 1998 respectively. As the theme in 1998 was my favorite subject on water issues, I made a presentation on the current situation in Japan. At this juncture, IAC sponsored one of the sessions on technology introduction in the Round Table, where the Akashi Strait Bridge was presented. In addition to the above, JSCE representatives participated in the annual conferecne of the Korean Society of Civil Engineers in 1997.

IAC is considreing the establishment of overseas branches or liason offices with assistance from former exchange students and / or Japanese resident members.

The above mentioned activities will be further expanded in the future, which is definitely helping advance the internationalization of JSCE and its members. I believe that IAC's active performance would greatly contribute to the mutual understanding and actions between civil engineers of Japan and those of other nations in the world.

Tatara Bridge - World's Longest Cable-Stayed Bridge

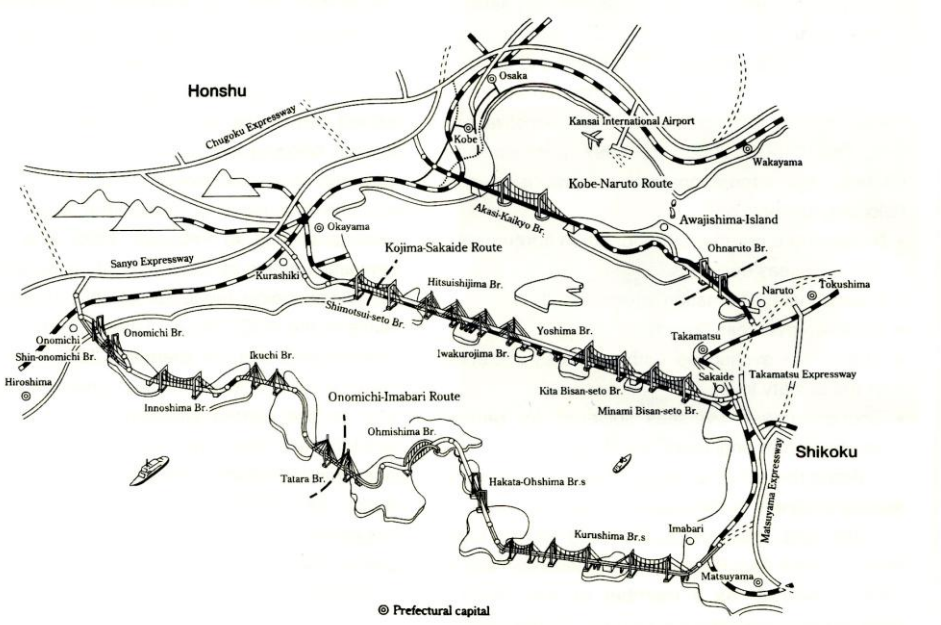

Figure-2 Three Routes of the Honshu-Shikoku Bridges

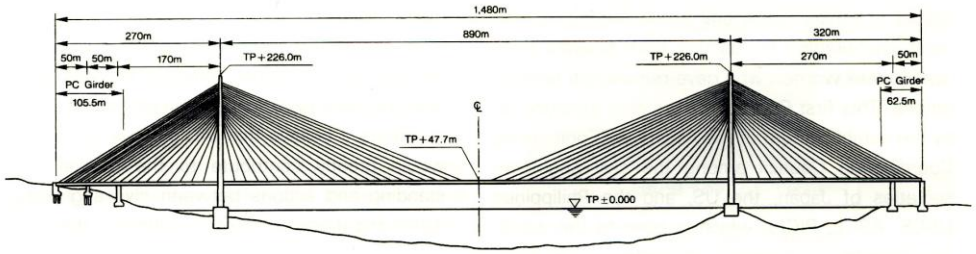

Figure-3 Tatara Bridge

1. Introduction

The Honshu-Shikoku Bridge Project, consisting of three routes linking two main islands, Honshu and Shikoku across the Seto Inland Sea, is a big project aimed to form part of the trunk road and railway network in Japan.

The western-most route, the Onomichi-Imabari highway route includes the Tatara Bridge, with a center span of 890m, the longest cable-stayed bridge in the world and a total length of

1,480m and the Kurushima Kaikyo Bridges (three consecutive suspension bridges). It was opened in May 1, 1999 as originally scheduled. Both of these bridges carry a four-lane highway as well as additional lanes for bicycles, motorcycles and pedestrians.

2. Design

The bridge was originally planned as a suspension bridge in 1973. However, in 1989 the design was altered to a cable-stayed bridge with the same main span by considering topographical and environmental constraint in the national park area and current technological advances in long-span bridge and developments in computer-based structural analysis.

Various analysis and experiments were condected focusing on the characteristics of long-span structure and the aerodynamic stability of entire bridge. Finally, these enabled the longest span cable-stayed bridge.

3. Innovative Technical Features

(1) Buckling tests for the girders with large compressions

The analysis shows that the ultimate loading capacity of long-span cable-stayed bridge is determined by buckling of gerders since the extremely large compressions are applied to towers and girders. A large-scale loading test with the scale of 1/50 was conducted to verify the accuracy of the analysis and confirm the capacity of the bridge. The results of the model test well agreed with the numerical solution for both the loading capacity and the limit state, and thereby the ultimate loading capacity was examined successfully.

(2) Wind resistant design

Due to the mutual interference of calbes and girders and the wind greatly influenced by the surrounding topography, a large-scale full model wind tunnel test with the scale of 1/200 was conducted to evaluate the influence of topography. The rest result shows the maximum gust response displacement at mid-span was within design tolerance.

To prevent the turbulence that results from wind blowing on rain water running on the surgace of the 460m long cable, the indented surface in the polyethylene cable coating that breaks up water rivulets was introduced through the study of wind tunnel test. This provides sufficient damping instead of the ties between cables.

(3)Cantilever erection of the superstructure

The cantilever erection of the center span, which exceeded approximately 435m at the maximum lenght, was carried out. A typhoon did come along while the center span was at its

furthest extention with the installation of the remaining final segment. However, the bridge suffered no damage.

(4) Field vibration test

The actual structural damping to withstand wind and earthquake is important for long-span bridge. After the bridge had been structurally completed, the vertical and horizontal vibration were measured by means of heavy-duty exciters, so as to confirm the accuracy of the vibration characteristics applied in the design. As a result, the measured logarithmic decrement for the main girder basically satisfied the design value requirement.

4. Conclusion

More than six year's consturction of the Tatara Bridge was accomplished successfully with no accidents and with great efforts to develop innovative technologies, improve and integrate the existing technologies at overall stages of research, design, fabrication and construction.

In addition to the contribution for regional development in the related area, the completion of this bridge will greatly contribute to realization of the dreams of 1,000m-class long span cable stayed bridges in the world.

Voice from the Students - Anat Ruangrassamee from Thailand -

I am studying in the master course of the Department of Civil Engineering, Tokyo Institute of Technology since October, 1996. My field of research is earthquake engineering as Japan is obviously leading the world in this particular dield of science. As you may be aware that in January 1995, the devastative earthquake named Hyogo-ken Nanbu (Southern part of Hyo Prefecture) earthquake stroke many areas in the vicinity of Hanshin (Osaka-Kobe). The earthquake accelerated Japanese and overseas researchers to develop more effective seismic design and retrofitting procedures. I had a chance to visit Kobe. I was impressed by many new concepts in seismic designs and retrofitting. At the same time, I was stunned by the realization of living conditions of people whose houses and families were wrecked by the earthquake. That experience confirmed the mission of earthquake engineering that aims at the safety and well-being of beloved people around us.

In addition to my study, I am interested in Japanese culture and life style. I have been challenging to learn Japanese. I see that the language is the essential tool to comprehend what other people are doing and to develop mutual understanding. Anyway, I enjoy my life in Japan. After the graduation of my master course, I decided to proceed to the doctor course. I would like to improve my problem-solving skill. And there are a lot of technical and social mysteries left for me to further explore in Japan.

Editor's Note

We have been gratified by the favorable response to the First Newsletter issued in February. In this second issue, thanks to the cooperations of many, the content has been enriched.

We are willing to make this periodical Newsletter vivid, and we are looking forward to receiving your comments and suggestions:

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