



# Japan Society of Civil Engineers Newsletter

**N O . 5   M a r c h   2 0 0 1**

## Annual Conference of JSCE in Sendai, 2000



*From left, Mr. Kim (President, KSCE), Mrs. Kim, Mrs. Hwang, Dr. Hwang (President, JSCE Korea Section), Dr. Chern (President, JSCE Taiwan Section), Dr. Li (President, CICHE), Ms. Lee (Vice President, IE, Singapore), Dr. Chang (Supervisor, CICHE)*

The 2000 JSCE Annual Conference was held at Tohoku University, Sendaikita Campus in Sendai from September 21 to 23. During three days, 6,593 participants gathered from all over Japan and from overseas as well for this grand event. The Conference featured special lectures by President Michio Suzuki and Prof. Yoichi Higuchi of Waseda University. In addition, it provided various technical presentations including a total of 3,890 annual academic lecture presentations, 21 issues presented by the ad hoc committees of JSCE in the panel discussion, the annual banquet, and the student union meeting.

The most remarkable was the “Year 2000 Declaration of Sendai on Social Overhead Capital and Civil Engineering (draft)–Civil Engineers’ Resolution”, which on this occasion served to redefine the ideal condition of social overhead capital provision of Japan today. Through lively discussions, lights were shed on the

significance and the basic concepts lying behind the provision of social overhead capital, taking in opinions of many civil engineers as well as those of the panelists. The Declaration has been officially approved in the 4<sup>th</sup> Board of Directors Meeting in November 2000.

The International Activities Committee hosted the following events, which were joined by President Suzuki and President-elect Prof. Tambo, along with participants from Korean Society of Civil Engineers (KSCE), Chinese Institute of Civil and Hydraulic Engineering (CICHE) and The Institution of Engineers, Singapore (IES). Presidents of Korea and Taiwan Sections of JSCE attended the 1<sup>st</sup> International Section Meeting. Opinions were exchanged among the visiting institutions/societies regarding problems of common interest. Various opinions were expressed, resulting in a very productive discussion.

### International Events by IAC

#### 1<sup>st</sup> Day (September 21)

- International Lunch
- Panel Discussion on "International Activities of JSCE" (Coordinator :Prof. Kamon )
- International Dinner

#### 2<sup>nd</sup> Day (September 22)

- Roundtable Meeting "Activation of Cooperative Societies and Institutes" (Coordinator Prof. Fujino)
- First International Section Meeting
- JSCE Annual Banquet

## ASCE 2000 Annual Conference

The ASCE 2000 Conference was held in Seattle, USA from October 18 to 21. President Suzuki and six other JSCE members participated in the event. In the International Session, JSCE gave a presentation on “Advanced Japanese Technology – A Preview of CECAR (Civil Engineering Conference in the Asian Region) 2001 – Tokyo” to attract participants to the 2nd CECAR. The Maglev model was displayed with cooperation of Central



*ASCE International Session*

Japan Railway Company and Overseas Construction Association of Japan in an exhibition parallel to the Conference, to draw younger generations to the 2nd CECAR Technical Visit. International Roundtable provided a discussion on e-commerce in the Construction Industry, a timely topic, when global concerns are turned toward IT revolution. Opinions raised in the discussion have been summarized in the ASCE website. The Japanese traditional calligraphy was a great attraction for Westerners in the International Gala.

## KSCE 2000 Annual Conference



*KSCE International Roundtable Meeting  
(President Suzuki, JSCE & President Kim, KSCE)*

The Korean Society of Civil Engineers warmly welcomed President Suzuki, and two other JSCE members at the KSCE 2000 Annual Conference held from October 27 to 28 in Yongpyong Resort, Korea. The opening ceremony and the plenary session were held on October 27. President Suzuki made a brief speech as an honorable guest at the Banquet in the evening of October 27, representing the sole participating international society.

On October 28, President Suzuki conferred a JSCE Fellow Membership on President

Kim of KSCE, the first among international members. Prof. Hanamura made a presentation on "Environmentally Friendly Effort on Highways in Japan" at the Round Table Meeting, under the main topic of "Environmentally Friendly Infrastructure Development in Asia". KSCE also introduced its environmentally friendly efforts in Korea on soil contamination, garbage disposal, and other related issues.

## CICHE 2000 Annual Conference



*Meeting with Public Construction Commission in Taiwan*

The CICHE 2000 Annual Conference was held in Taipei on December 2. President Suzuki and two other JSCE members participated in this event. Prior to the Annual Conference, an opinion exchange took place with the Public Construction Commission on the execution system for public works and other topics of interest. The International Roundtable was one of the programs in which ASCE members joined for a lively discussion. JSCE International Activities Committee presented its views on how JSCE may provide useful information to societies and institutions abroad, in time when bilateral cooperation is being transformed into such multilateral council like ACECC.

## JSCE Technical Committee News Hydraulics Committee

### *1. Activities of the Committee*

The original purpose of the committee was to edit a handbook of hydraulics, but from 1956 onwards, the range of the committee's activities extended considerably. Starting with hydrology, various specialist subcommittees were formed; since 1988, three permanent research

subcommittees in Fundamental Hydraulics, Environmental Hydraulics, and Hydrology, have been entrusted with organizing cooperative investigations and reviews on various topics. In 1998, the fourth such subcommittee was established to coordinate activities related to River Engineering. In addition, the committee has organized a subcommittee to provide technological guidance for development and management of domestic rivers, and temporary teams to survey flood-sediment disasters, both domestic and overseas.

Frequent conferences and workshops have been organized: annual conferences on hydraulics, annual summer workshops (in cooperation with the coastal engineering committee), annual fluvial disaster symposia, Association for Global Environmental Hydraulic Research (AGEHR) symposia and annual water symposia.

## 2. Publications

### a. Handbook of Hydraulics:

From 1956 onwards, revision of the hydraulics handbook was entrusted to a subcommittee that has produced six revisions of the handbook, the most recent in 1999, along with two versions of a complementary edition of practical examples. The third edition of worked examples will be published soon.

### b. Annual Journal of Hydraulic Engineering:

Starting from a small collection with only 22 papers in 1956, the annual hydraulics conference has met 44 times as of 2000; received contributions now number over 200 and are being published in the JSCE Journal of Hydraulic Engineering. Prizes for outstanding papers by young researchers as well as for the most outstanding paper have been established.

### c. Texts of Annual Summer Workshops:

Starting in July 1964, annual summer workshops have been held for the benefit of young researchers and technologists. Two four-day courses are offered, one on river and dam engineering, the other on coastal and harbor engineering. The course texts are sold in considerable numbers even to non-attendees.

### d. Journal of Hydrosience and Hydraulic Engineering (JHHE):

Starting in April 1983, this biannual English-language journal has published outstanding research works from Japan and overseas, and now enjoys a considerable international reputation.

## 3. International Activities

The committee actively interacts with international professional societies in the areas of fluid dynamics and water resources. Notably strong is the connection with the Delft-based International Association of Hydraulic Engineering and Research (IAHR) as well as with the International Association of Hydrological Sciences (IAHS).



*Prof. S. Ikeda, Chair, Hydraulics Committee*

*(Dr. Syunsuke Ikeda is a Professor at the Department of Civil Engineering, Tokyo Institute of Technology. His major research areas are sedimentation, ecological hydraulics and river mechanics. He is currently organizing the UK-Japan Joint Research on Flow and Sediment Transport in Two-stage Channels and the 2<sup>nd</sup> IAHR Symposium on River, Coastal and Estuarine Morphodynamics to be held in Obihiro in September, 2001.)*

## Advanced Shield Tunneling Methods in Japan

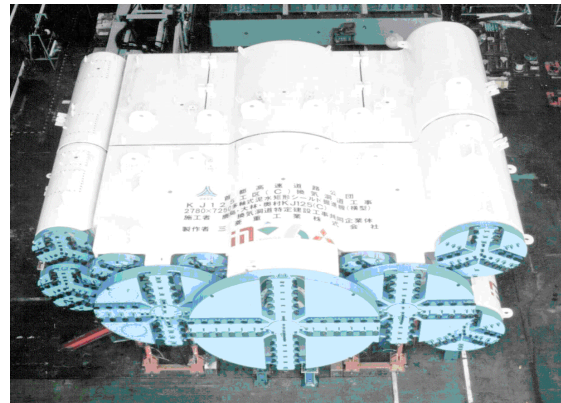
In Japan, most of the mega-cities are located in coastal areas, where many underground structures, such as subways, utilities and expressway tunnels, are being constructed in soft and water bearing soil layers. The shield tunneling method has been utilized extensively and fine-tuned to safely construct tunnels of various sizes and sections in variable soil conditions or very congested underground without affecting the surface conditions and existing structures. This article highlights some of the most advanced shield tunneling technologies.

### *Non-Circular Tunnel Sections*

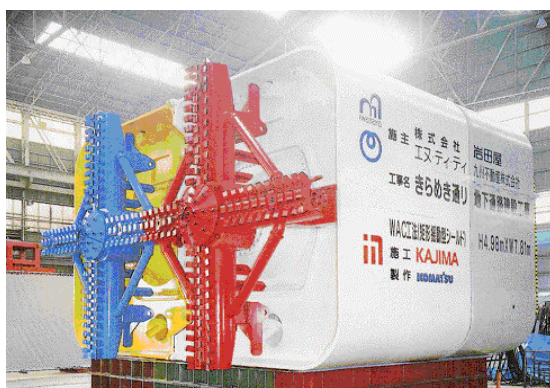
In urban areas, where a conventional circular section tunnel would be impossible due to



*DPLEX Shield Machine*



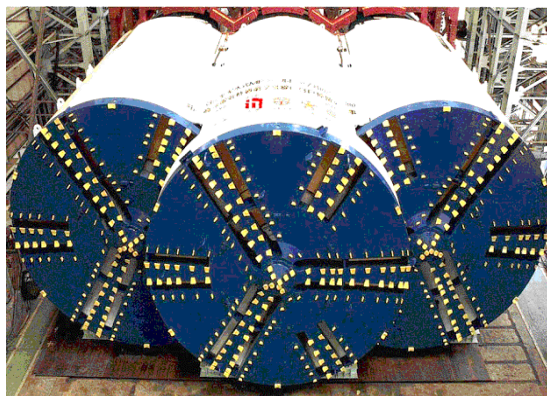
*Multi-Micro Shield Machine*



*Wagging Cutter Shield Machine*



*Shield Machine for MSD Method  
(Penetrating ring is extended for coupling)*



*Multi-Circular Face Shield Machine*

constraints from existing structures, a non-circular tunnel section is often a solution. The method developed to achieve this is the DPLEX Shield Method. Groups of cutters rotate with eccentricity along the perimeter of the shield face to excavate tunnels with an oval or rectangular shape. The Wagging Cutter Method with a pair of reciprocally rotating cutters is another way to achieve the same purpose. A semi-rectangular section subway tunnel, approximately 9-m wide and 6.5-m high, is being constructed in Kyoto using this method.

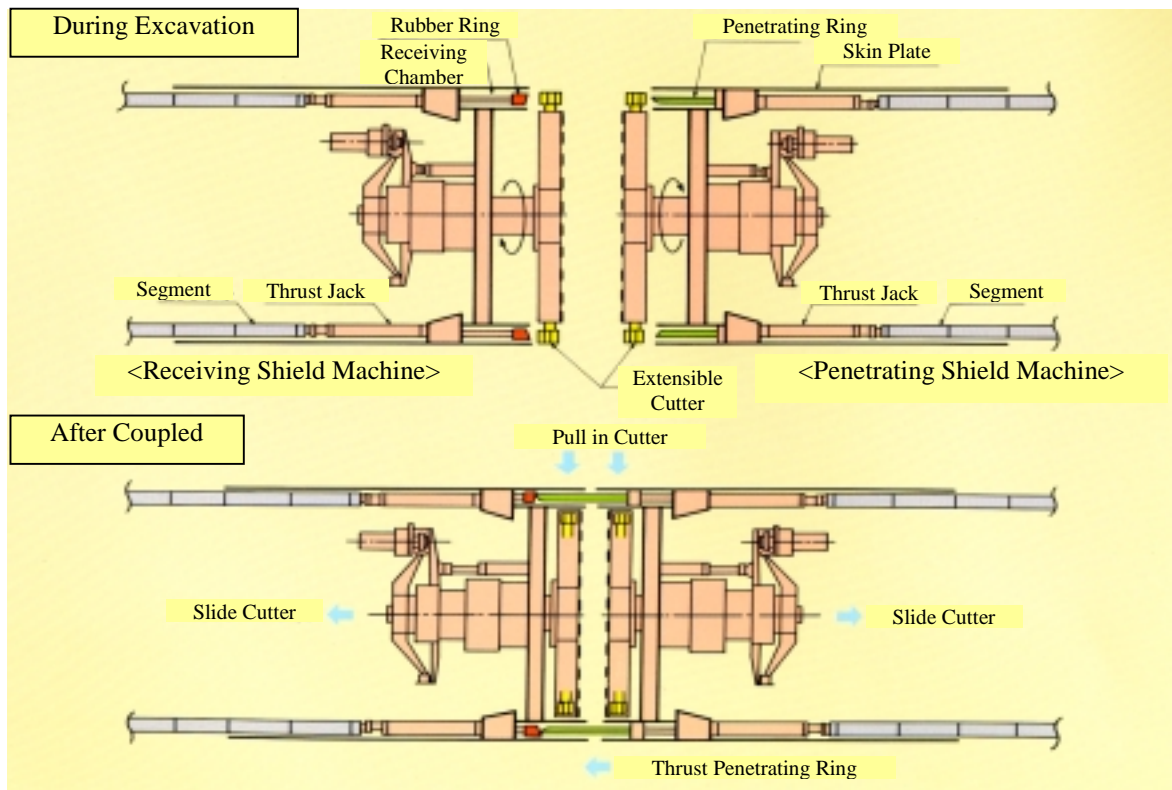
The Multi-Circular Face Shield Method has been developed and used to construct a wide rectangular tunnel for a subway station in Osaka Business Park (17.3-m wide x 7.8-m high).

The Multi-Micro Shield Tunneling (MMST) Method has gone through practical test construction at Trans-Kawasaki Route of Metropolitan Expressway. This project is to construct approximately 15-m wide and 14-m high tunnel sections by utilizing a combination of small diameter shield machines.

*Dealing with Lack of Land Space for Arrival Shafts*

In a densely populated area, it is quite difficult to secure land space for a shield machine arrival shaft in many cases. It is also impractical to construct arrival shafts in a water area.

The Mechanical Shield Docking Method (MSD) makes construction of shield tunneling possible without shafts. The steel shell of one shield machine is pushed forward into the other machine coming from the opposite direction and the two machines can be coupled mechanically.



*Coupling Shield Machines by MSD Method*

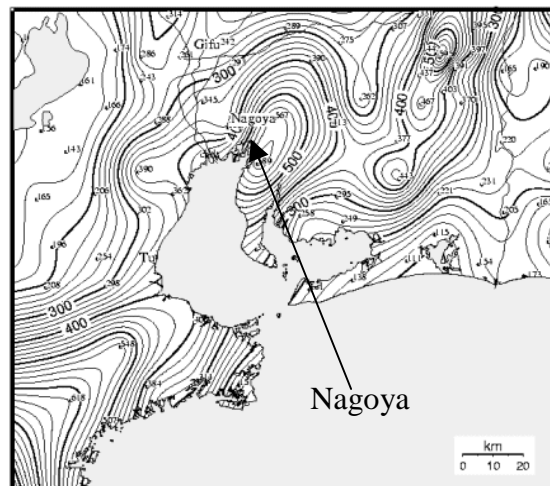
### *Very Large Diameter and Very Deep Tunnels*

Tunnels with very large diameter in more than 10-m have been accomplished using these methods. The 9.4-km long Trans-Tokyo Bay Tunnel completed in 1997 utilized shield machines of 14.14-m in diameter. The Metropolitan Area Outer Discharge Channel Tunnel employing approximately 12-m diameter shield machines is currently under construction. The shafts for this project are as deep as 69-m to 74-m below grade.

### **Natural Disasters in Japan: Flooding in Tokai District and Earthquake in Tottori Prefecture**

On September 11 and 12, 2000, Tokai District (Nagoya and the surrounding area) experienced an unusually heavy rainfall caused by a typhoon. The accumulated precipitation reached as much as 600-mm in some areas. It was 1.2 times as much the normal precipitation for an entire month of September.

The damages included inundation of buildings, failure of revetments, landslides, debris, and mudflows. About 78,000 houses were inundated. Flooding of this scale had not occurred



*Accumulated Precipitation for September 11 and 12, 2000 (in mm) near Nagoya*

for the last 18 years in Japan. The Shinkansen (Bullet) trains were stopped for 24 hours because of the continuous heavy rainfall, and over 50,000 passengers had to spend a night in the stranded trains. It was the longest stoppage since the opening of Shinkansen system in Japan. The accumulated precipitation map for September 11 and 12 is shown in the figure above.



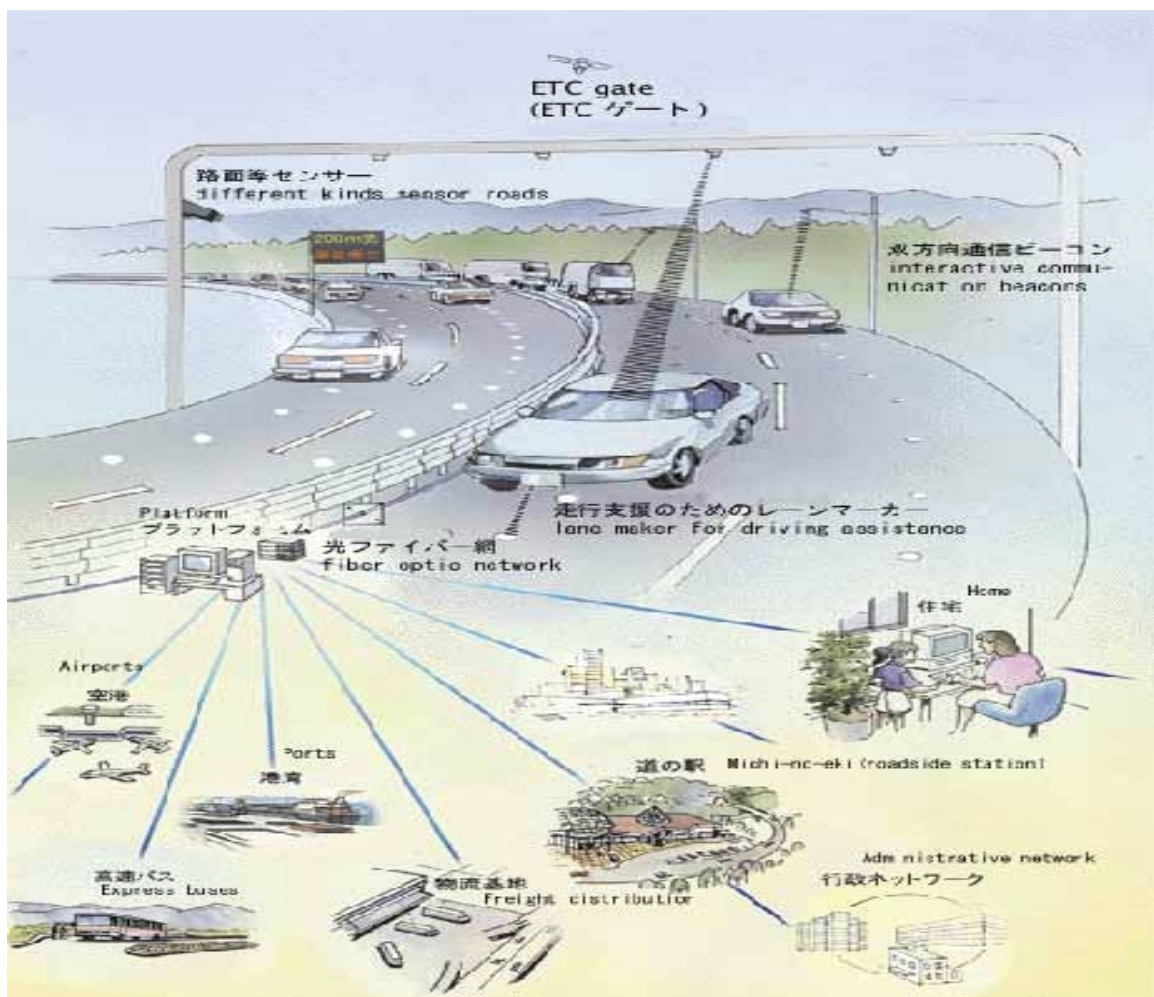
Earthquake Damages in Tottori Prefecture

In the afternoon of October 6, 2000, a very strong earthquake (M7.3 JMA) occurred in Tottori Prefecture in western Japan. About 100 people were injured, but there were no fatalities. The maximum seismic intensity measured on JMA scale was 6+ at the epicenter. The quake was felt

over a large area of western Japan. The seismic intensity on JMA scale in Kyoto and Kobe was 4, and 3 in Osaka. There were many aftershocks including those over 800 occurring from October 6 to 8. The strongest aftershock was at M5.4 (JMA) on October 8. Damages include slope failures, sand liquefaction, various building damages, and major cracks in roadways. An example of road and slope related damage near the epicenter is shown on the left.

## Trend of IT Revolution in Japan's Construction Industry

Information Technology (IT) is expected to not only enlarge the market scale of IT industry itself and bring about economic effects on other industries, but also to provide a greater enhancement in productivity and management efficiency. The Japanese Government has recently



Utilization of IT in Transportation System



*Utilization of IT in Watershed Management*

been promoting active utilization of IT in every sector for attaining sustainable economic growth.

In line with the directives of the Government, vigorous efforts to introduce IT into practice have also begun in Japanese construction industry. This includes not only the implementation of CALS/EC programs aiming at starting electronic procurement in public works but also a change of public works administration from hardware (equipment and facilities) to software.

IT indeed can play a very important role in various fields of the construction industry, including efficient and effective maintenance of roads, rivers, and sewerage systems with the help of optical fibers, emergency management and environmental management utilizing Geographic Information Systems (GIS), etc. IT can also be very much instrumental in Public Involvement (PI) for public works projects such as collecting opinions from citizens through the Internet during the planning phase of an urban development master plan. Especially, IT can efficiently be applied in improvement of road functions, which helps build a highly efficient physical distribution system amidst today's international competition. Today, nations around the world are attempting to develop and refine the Intelligent Transportation Systems (ITS) as shown in the figure. Marching hand in hand with other developed nations, Japan is also striving to employ various advanced IT systems, such as the Electronic Toll Collection (ETC) system in highway infrastructures. The radio

communication system of ETC, has obtained the approval of international standard from the International Telecommunications Union (ITU).

### Memoirs of Study Tour to Japan by Ms. Lee Bee Wah (Vice President, Institution of Engineers, Singapore)



*With Mr. Miyoshi on left and Mr. Matsuo on right*

I was overjoyed, when I was given the annual study tour grant by Japan Society of Civil Engineers (JSCE) in the beginning of this year. It was my first trip ever to Japan. I would like to take this opportunity to thank JSCE for its generosity of giving me this annual study grant.

I quickly scheduled my trip, at first, trying to coincide with the school holidays in Singapore (so that I could bring along my family members). Then, it was re-scheduled due to my commitments back home. Finally, I made my trip to coincide with the JSCE International Conference. The decision made was correct because it gave me the opportunity to meet with the JSCE representatives from Korea and Taiwan as well. The exchange was indeed very beneficial as the Institution of Engineers, Singapore is also outward looking and would like to learn from other similar organizations.

Upon arriving in Japan, I was overwhelmed by the hospitality rendered by all the officials from JSCE and the organizations I visited. My study trip went on very smoothly and it was really an eye opener for me. Along the way, I made quite a lot of friends and I hope that in future we could meet again.

The writing of my report on the study tour is in progress. I hope to submit my report very soon and any feedback from your members would be highly appreciated. Once again, I would like to express my gratitude to JSCE. Your study tour grant is highly commended and I would recommend other civil engineers to vie for this study grant.

## English Graduate Program at Hokkaido University

Hokkaido University is the most recent University to offer a graduate engineering program in English. The English Graduate Program in Socio-Environmental Engineering (EGPSEE) was established in 1999 and enrolled its first batch of students in October 2000. For further information, visit the homepage:  
<http://www.civil.hokudai.ac.jp/egpsee/index.htm>

Or write to:

**EGPSEE**  
**Graduate School of Engineering**  
**Hokkaido University**  
**Sapporo 060-8628, Japan**  
**Fax: 81-11-7067291**  
**E-mail: [egpsee@eng.hokudai.ac.jp](mailto:egpsee@eng.hokudai.ac.jp)**

## Book Review

### *ARTICLES (From July 2000 to December 2000)*

Coastal Engineering Journal, Vol. 42, No. 3, No. 4, World Scientific Publishing Co., Ltd., September

2000, December 2000, Total 430 Pages: Price US\$ 250 (4 issues) [ISSN 0578-5634](#)

Concrete Library International, No. 35, JSCE, December 2000, 307 Pages: Price Yen 2,625 (US\$ 35) [ISSN 0913-4913](#)

Journal of Hydrosience and Hydraulic Engineering, Vol. 18, No. 2, JSCE, 2000, 178 Pages: Price Yen 3,150 (US\$ 41) [ISSN 0912-2508](#)

Journal of Global Environment Engineering, Vol. 6, JSCE, September 2000, 116 Pages: Price Yen 6,000 (US\$ 75) [ISSN 1341-1268](#)

Structural Engineering/Earthquake Engineering, Vol. 17, No. 2, JSCE, October 2000, 124 Pages: Price Yen 2,039 (US\$ 27) [ISSN 0289-8063](#)

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