Japan Society of Civil Engineers
International Activities Committee

Newsletter

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Outdated "Internationalization" for JSCE in Next 100 Years

Tamon UEDA
Chair of JSCE International Activities Committee

JSCE will celebrate the 100th anniversary in 2014. For the next 100 years, JSCE is taking the major step for its internationalization under the initiative of the present President, Mr Takuro YAMAMOTO. JSCE Strategic Council for Internationalization of Civil Engineering, chaired by Prof Shigeru MORICHI, Past JSCE President, will come out with the conclusions in the early 2012. The followings are the expected changes in the near future:

- Strengthen JSCE Headquarter by setting up a new office, **International Center** (tentative), headed by a newly recruited personnel with full experience in international environment
- Prepare the **database** related to international activities by JSCE and/or civil engineering in Japan, which can serve to JSCE members and related people
- Tighten the **bilateral relationship** between JSCE and sister organizations by introducing permanent committees and regular meetings
- Improve information dissemination in English such as **homepage and newsletter** by enhancing information volume/variety and mailing-list

The budget for international activities in JSCE is only 4% of the total budget, which is significantly less than in the similar organization, such as ASCE and KSCE. The international members, which are 750 as of December 2011, is only 2% of the total members of JSCE. Activities by the technical committees in JSCE are mostly domestic matters. Those facts indicate that JSCE may not be friendly enough to the international members.

Great East Japan Earthquake hit Japan in 2011 leaving the historical damages, while several rain storms caused damages like in the past years. The country of Japan provides so unique environment to civil engineering. Harsh natural disasters by earthquakes, rain storms and others require civil engineers to develop high quality of infrastructure for assurance of safety. On the other hand Japan is full of beautiful natural environment, such as mountains and sea coasts. This fact teaches civil engineers to be fully aware of natural environment protection. This uniqueness is a good reason for civil engineering in Japan to be a model to the rest of the world. In this sense JSCE should take the leading role.

"Internationalization" should not be a target for the next 100 years since JSCE is supposed to have been transformed to an international organization to serve globally.

The Earthquake Damage and the Restoration Status of the Railway Facilities of JR East Japan

Railway companies control the train service by placing seismographs along the railway lines and the coast, and observing the earthquake vibrations. JR East Japan uses the SI value (Note 1), which is said to have a high correlation with the damage to structures for the observation index of earthquakes. In the case of the 2011 Earthquake off the Pacific coast of Tohoku, which occurred on March 11, big tremors were recorded across a wide stretch from the Tohoku area to the Kanto area, for example, 107.7 kine at Shin-fujita substation on the Shinkansen (suspension standard value 18 kine), and 92.2 kine at Tatekoshi on the local line (the standard value for suspension in a general section: 12 kine) were recorded and a lot of railway facilities were affected. In addition, along the Pacific coast, enormous damages were caused such as washouts of station buildings, bridges and railways by the massive tsunami. Furthermore, aftershocks frequently occurred in the course of restoration and a lot of new damages were caused by the aftershock on April 7. Here in this article, the damages caused by the earthquakes and the restoration status are reported.

Detection of earthquakes and the train control.

By seismographs' detecting earthquake motions, warnings were sounded to stop power for the train operation for all the way from Tokyo to Shin-Aomori on the Tohoku Shinkansen. Especially, in the vicinity of Sendai, which is close to the seismic center, the seismograph set up in Mt. Kinka on the Pacific coast immediately detected the earthquake motion, and its warning was able to work the emergency brakes of the trains just 12-15 seconds before the very strong quake which reached the standard to stop the train operation.

On the local lines, in the Metropolitan area and in the Sendai area, by the data of some of the seismographs that detected a very strong quake, wireless train protection system automatically started to work and all the trains in the area were successfully stopped.

After the earthquake occurrence, while passengers were evacuating from the trains and stations, all of them on board the trains on the lines hit by the tsunami were able to get out of the trains and evacuated without big injuries after the trains stopped.

As described above, stating with safety confirmation of the passengers on board the trains and in the stations, we started checking the damage status of the rail facilities by our employees and subcontractors in parallel with safety confirmation of the employees and their families.

Damage on the rail facilities and restoration

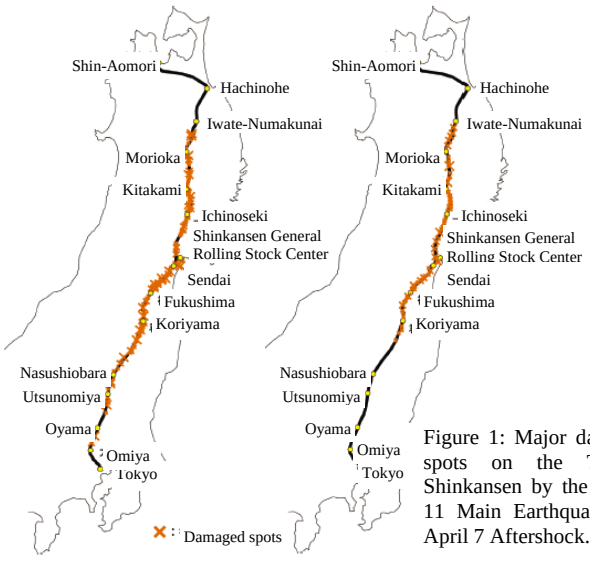
(1) Shinkansen facilities

No derailment accidents of Shinkansen in operation occurred by the earthquake this time. Table 1 shows the major damage contents and the numbers of damaged spots, and Figure 1 shows where the damaged spots are. At the time of the March 11 earthquake occurrence, a lot of various structures were damaged in a widespread area from Ohmiya to Iwate-numakunai. The damaged area by the April 7 aftershock was narrower compared with the March 11 main shock, however, the damage status between Sendai and Ichinoseki was even more serious.

Train operation was resumed area by area, where damages were restored as shown on figure-2. Finally, it was resumed in all the affected area on 29 April 2011.

Table 1: Main damages on the Tohoku shinkansen and the numbers of the damaged spots

Major damages	March 11 Main shock	Aftershocks after April 7
Power pole breakings, inclining, cracking	Approx. 540 spots	Approx.270 spots
Wire disconnection	Approx. 470 spots	Approx.200 spots
Damages on viaduct pillars, etc.	Approx. 100 spots	Approx. 20 spots
Track displacement, damages	Approx. 20 spots	Approx. 20 spots
Power substation facility failures	Approx. 10 spots	Approx. 10 spots
Falling, inclining, detachment of sound insulating walls	Approx. 10 spots	2 spots
Breaking and falling of ceilings	5 stations	2 stations
Bridge girder displacement	2 spots	7 spots
Damage on the bridge girder supports	Approx. 30 spots	Approx. 10 spots
Damages on the track in tunnels	2 spots	
TOTAL	Approx. 1,200 spots	Approx. 550 spots



Damages by the 3.11 main shock

Damages by the 4.7 aftershock

Figure 1: Major damaged spots on the Tohoku Shinkansen by the March 11 Main Earthquake and April 7 Aftershock.

Photo 1: Damage on viaduct pillars (Mizusawa-esashi – Kitakamima)

Photo 2: Damage on a bridge pier (Ichinoseki – Mizusawa-esashi)

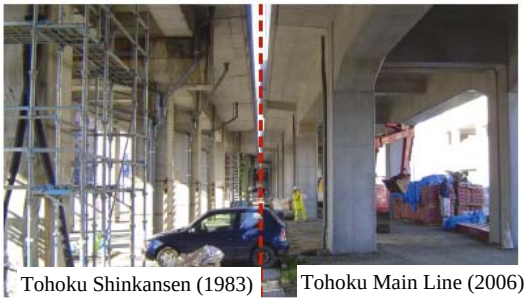


Photo 3: Damage on viaduct pillars (Shiraishi-zaou – Sendai)

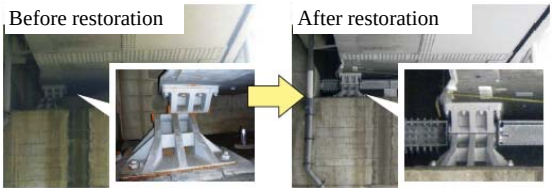


Photo 4: Bridge girder displacement・damage on a bearing

Photo 5: Damages on the power poles (Mizusawa-esashi – Kitagami)

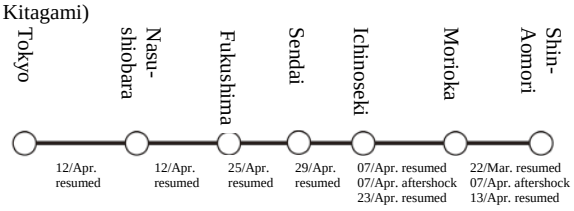


Figure 2: Operation restart days at each section of Tohoku Shinkansen

(2) Local line facilities

Photo 6: Bridge girder displacement (Kashima-Jingu Station, Kashima Line)

Photo 7: Collapse of an excavated slope (Tohoku Main Line, Toyohara – Shirasaka)

Table 2 shows the main damage contents and the numbers of damaged spots.

On the local lines, a lot of places were affected in a widespread area from Tohoku to Kanto.

Table 2: Main damages on the local lines and the numbers of the damaged spots

Main damages	March 11 main shock	Aftershocks after April 7
Track displacement	Approx. 2,200 spots	Approx. 620 spots
Power pole breakings, inclining, cracking	Approx. 1,150 spots	Approx. 90 spots
Roadbed crushed stone washout	Approx. 220 spots	1 spot
Platform deformation	Approx. 220 spots	Approx. 50 spots
Deformation of civil engineering work such as embankment and excavation	Approx. 170 spots	Approx. 10 spots
Failures of signals and communication facilitis	Approx. 130 spots	Approx. 10 spots
Damages on bridges and viaducts	Approx. 120 spots	Approx. 30 spots
Damages on station buildings	Approx. 80 stations	Approx. 20 stations
Damages on tunnels	Approx. 30 spots	2 spots
Failures of power substations	Approx. 30 spots	Approx. 10 spots
Debris fall	Approx. 20 spots	Approx. 10 spots
Damages on railroad depot facilities such as transfer over-bridges	Approx. 20 spots	Approx. 4 spots
Wire disconnection	Approx. 10 spots	Approx. 10 spots
TOTAL	Approx. 4,400 spots	Approx. 850 spots

With regard to the breaking and inclining damages of power poles on the bridges and viaducts which occurred in many places by this time's earthquake, we will conduct an analysis of the cause and the mechanism, work on the reinforcing methods and address improvement of earthquake resistance. On the other hand, the effects of antiseismic reinforcement that had been carried out until then were verified. From now on as well, we will successively work on the earthquake countermeasures and pursue efforts for securement of the railway safety and the stable transportation.

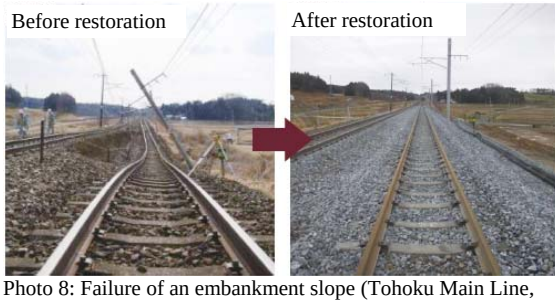


Photo 8: Failure of an embankment slope (Tohoku Main Line, Umegasawa – Nitta)


Photo 9: A bridge girder washout by the tsunami (Yamada Line, Kirikiri – Otsuchi)

Mitsuyasu Mizuno: East Japan Railway Co.
Shinichiro Nozawa: East Japan Railway Co.

Note 1: The index, called "spectrum intensity", that is able to indicate the size of damage on a structure, refers to the average response velocity of frequency band that affects fracture of a structure (unit: cm/sec=kine).

Report of PII-JSCE Joint Seminar "Framework Development of Public Works Procurement System in Indonesia"

The joint seminar on "framework of public procurement systems in Indonesia" was held by the construction management committee of the Japan Society of Civil Engineers (JSCE), the Institution of Engineers Indonesia (PII), Construction Development Agency (BP Konstruksi), Institut Teknologi Bandung (ITB) in Jakarta, Indonesia on November 23 and 24 in 2011. The first day and the second day seminar were held at Hotel Nikko Jakarta and the Ministry of Public Works, respectively.

The objectives of this joint seminar are to present and share development history, current conditions, issues, and reform direction of public procurement schemes in Japan and Indonesia and to discuss how Indonesian scheme can be further improved. The program on the first day consists of three keynote lectures and two panel discussions. 74 people from the Indonesian side and 9 people from the Japan side attended the first day seminar. On the second day seminar, 12 people attended and discuss labor management on an international JV (joint venture) and possibility of joint research.

These seminars were very fruitful. First, the participants in the both countries could recognize and share effectiveness and challenges of public procurement scheme each other. Second, the consensus was built among the participants on the necessity of development of quality assurance systems in public works in Indonesia. Third, as a way to realize the assurance systems, a possibility was demonstrated that two systems in Japan can be referred as a model for Indonesia: "Circulation system" to reflect past performance of each contractor for bidding and construction information systems. Fourth, agreement on further research collaboration was made in the both countries (Pictures 1 and 2).

Picture 1 One Scene of Active Discussion

Picture 2 Wishing for the 2nd Seminar

The seminar was supported by the International Scientific Exchange Fund, JSCE. We would also like to thank Prof. Rizal Z. Tamin and staff at the ITB for their sincere cooperation and assistance.

Main Topic 1
"Reform of public works procurement systems"
<Keynote speech 1>
Title: "Roadmap of Indonesian Public Procurement Development"

Djamaludin Abubakar
(Deputy Chairman, Law Affair and Complaint Handling of National Public Procurement Agency (LKPP))

<Panel discussion 1>
Topic: "Direction and framework of public works procurement reform"
Chair: Prof. Tsunemi Watanabe (Kochi University of Technology: KUT)
Dr. Takashi Goso (KUT)
Mr. Yuji Ikeda (JICA)
Dr. Dewi Larasati (KUT)

Main Topic 2
Challenges in improving construction work performance
<Keynote speech 2>
Title: "Experience and Challenge of Public Works Procurement System Reform in Japan"
Prof. Kazumasa Ozawa (University of Tokyo)
<Keynote speech 3>
Title: "Constraint and consideration in developing road map of government act and commitment in construction works performance improvement"
Ir. Bambang Goeritno M.Sc. (Director General of Construction Development Agency, Ministry of Public Works)
<Panel discussion 2>
Topic: "Role of legal framework, organization, and information system in performance improvement of Indonesian infrastructure implementation"
Chair: Prof. Rizal Z. Tamin (ITB)
Dr. Krishna S. Pribadi (LPJK)
Prof. Dradjat Hoedajanto (HAKI)
Dr. Sudarto (AKI)
Dr. Akhmad Suraji (KAKI)
Prof. Tsunemi Watanabe (KUT)

Photo Report from JSCE Magazine

The Construction of Tokyo Sky Tree, A Challenge to the height by human – New landmark tower in Tokyo –

Photo credit: Obayashi Corporation
Author: Masahiro Satoh, Director, Obayashi Corporation

Tokyo Sky Tree (Project implementing body: Tobu Railway, Tobu Tower Sky Tree) is a very slender tower with a width-height proportion ratio of 3.9: the foot width 68 meters to the height, 634 meters. Its structure style is a hybrid structure consisting of the center column made of reinforced concrete and the tower body made of steel truss, employing the center column vibration control, which controls joint vibration of the tower body and the center column by vibration control damper.

The construction of this tower was a challenge to the unprecedented height, which required three cutting-edge technologies in order to ensure the successful construction.

Firstly, as a pile to hold the ground, the "Knuckle-wall method" of piles with knuckles that exerts resisting power against the large pulling power by earthquakes and winds as well as the indentation power.

Secondly, in order to efficiently implement the work at the unknown height and also secure the safety and good quality, the "Lift-up method" by which a gain tower of approx.165 meters long is assembled on the ground and lifted up to the height of 634 meters.

And thirdly, the "Slip-form method" by which the reinforced concrete center column is constructed efficiently in parallel with the construction of gain towers.

Adopting the above three high-level technologies in combination made an unprecedented height a reality.

Tokyo Sky Tree, which rises up to the height of 634 meters in the air from the foundation at the depth of 50 meters underground, is giving dreams as a landmark tower in downtown Tokyo to the people who are waiting for its opening day on May 22, 2012.

Photo 1: Construction of the gain tower

Photo 2: Inside of the central pillar under construction

Photo 3: Truss structure

Photo 4: At around 50 meters above the ground

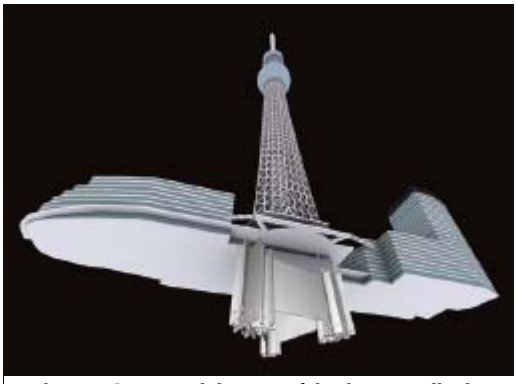


Photo 5: Conceptual diagram of diaphragm wall piles

Photo 7: Air photo of the tower foot construction (June 7, 2009)

Photo 8: The design where the "sori" (concave curves) and "mukuri" (convex curves) were consciously intended.

Photo 6: It reached the utmost height of 634 meters

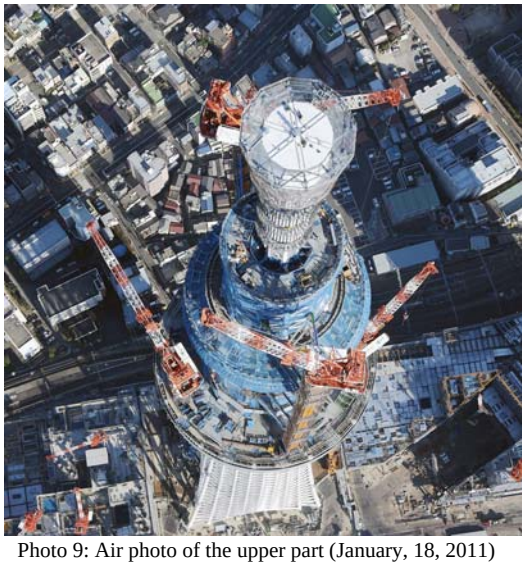


Photo 9: Air photo of the upper part (January, 18, 2011)

Excellent Speakers from Summer Symposium

The Trip that Changed my Life!

It was a long flight which lasted almost a day that I arrived, Japan, the country that is commonly referred as one of the "Far East" countries. I arrived with high curiosity, not only because I was new to the country, but also because this was my first trans-continental trip. It is only when I compare my current outlook with that of 2004, when I arrived Japan, I can understand the change that I have gone through. Back then, almost everything I see, I hear was new to me and life without a helping tutor was challenging. Today, after 8 years, all that seems to be of the past history!

Perhaps, this may be attributed to the 6 years of my post graduate studies, which was the primary purpose that I came for. However, I personally think that it is beyond conventional schooling and much more related with exposure and interaction with surrounding environment. It is shortly after my arrival that I made strategic decision that I should widen my understanding beyond the campus. I fully acknowledged that this is an opportunity that I shouldn't miss. Today, thanks to the extremely encouraging environment, language and cloture and no barrier and no matter where I am or who I meet it is an opportunity to learn!!

During my stay not only did I got my M. Sc and Ph.D. but got married and become a father of two! Currently I am a research fellow at the Institute for Transport Policy Studies (ITPS), a leading Japan think-thank institute. I have been enjoying participating in the International JSCE Summer Symposium, and I am honored to receive an award at the 13th Symposium held in 2011.

I came from an African country with little exposure opportunity about Japan and Japanese culture, making Japan to appear a remote country to many people there. The news-world may still keep referring Japan as `Far-East` country. But my experience proved to me that it isn't the distance which matters, and Japan is closer than many can imagine.

Esmael Mohamed,PhD
Research Fellow, ITPS

Information

14th International Summer Symposium

in conjunction with JSCE 67th Annual Conference

Date: Sept 5-6, 2012
Venue: Nagoya University, Aichi, Japan
Website: http://www.jsce-int.org/
Paper submission deadline: PM 5:00, 6th April 2012

This year, International Summer Symposium will be held as a part of JSCE 67th Annual Conference. Please register and submit your paper through the JSCE 67th Annual Conference website.
http://committees.jsce.or.jp/zenkoku/gaiyo/top (in Japanese)

Select the 'International Session' in 'Common Session (CS)' to submit your paper. After your submission, JSCE international office will provide the detail information. If you are not going to submit a paper, please make contact with JSCE international office below.

Registration fee is required only for the participation in the JSCE Annual Conference except the Symposium Dinner. In addition, participants who will make a presentation must be a member of JSCE. If you are not the member, please register the membership by 26th March to get your membership ID.

Inquiry: International Affairs Section, Japan Society of Civil Engineers (JSCE)
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Event Calendar

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