JSCE Study Tour Grant 2002
Study Tour Report
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Recommended by Institute of Engineers, Bangladesh（IEB）

1. INTRODUCTION

Recently the Japan Society of Civil Engineers (JSCE) has celebrated its 75th Anniversary and has started allotting a series of Study Tour Grants to the similar societies/institutes of different countries for last 10 years. In continuation, this year in 2002, JSCE invited the Institute of Engineers, Bangladesh (IEB) to propose one of its members for the Study Tour Grant 2002 to Japan. The authority of the Institute of Engineers, Bangladesh was kind enough to select me for the tour and proposed my name to the JSCE. Accordingly JSCE accepted the proposal of IEB and invited me for the Study Tour as per the schedule given in the Appendix.

It is quite helpful to get such an opportunity to visit Japan as an engineer form a developing country like Bangladesh, and it is a very important way to enhance mutual understanding between colleagues in different cultures and different parts of the world, and to learn form each other experiences and the ways problems are solved. It is also much more interesting to get a view of current projects and techniques by means of study visits to the sites of a technically developed country like Japan and discussion with the engineers involved.

The study tour took place from October 7th to October 11th 2002. Its itinerary had been designed to have a well-balanced mix of visits to a university research center, some governmental and some public research institutes and finally some construction sites in and around Tokyo Metropolitan area.

2. THE TOUR AND MY OBSERVATION:

On October 06, 2002, I arrived at Narita Airport in the evening and *Mr. Tsuyoshi Hashimoto* of International Affairs Section of JSCE was kind enough to come to the airport to receive me and he accompanied and guided me to my hotel.

2.1 Japan Society of Civil Engineers (JSCE)

Next morning on October 07, 2002, *Mr. Naoyuki Kumagai* of International Affairs Section of JSCE came to my hotel and took me to the Head Office of the Japan Society of Civil Engineers. There I met the higher officials of JSCE named *Mr. Masashi Matsuo*, Secretary General of JSCE, *Mr. Furuki Moriyasu*, Executive Director of JSCE and *Mr. Suzuki Motohiro*, Manager, Planning & Public Relations Section, International Affairs Section of JSCE. We had a brief meeting and exchanged our views - how to make good relation and co-operation between JSCE and IEB.

Then I was explained about the background and activity of JSCE, which was established in 1914. At present its membership has gone up to 42,000 civil engineers out of which 36,000 are regular members and 6,000 are student members. There is a Board of Directors to conduct the overall activities of JSCE, whereas 10 Divisions are there to perform these activities. JSCE has 8 Regional and one International Chapters. The main objective of JSCE can be stated through its Mission Statement: "JSCE shall contribute to the advancement of scientific culture and the development of society by promoting the field of civil engineering, developing civil engineering activities, and improving civil engineering skills." Further, JSCE is a team of experts, contributing to build the foundation for sustainable development of society & economy and to the creation of rich and beautiful national land, based on respect and understanding for nature. The three main pillars of JSCE are – Advancement of Science and Technology, Contribution to Society, and Members Services.

After the meeting I was guided to show the whole office building and the newly constructed beautiful Library Building of JSCE. I was quite satisfied as I found a good number and collection of Books, Journals and Periodicals in the Library both in English and Japanese. The surrounding environment of the JSCE premises was very calm and quiet and was very pleasant for study.

2.2 Earthquake Research Institute, University of Tokyo

In the afternoon of October 07, 2002, I visited the Earthquake Research Institute, University of Tokyo. *Prof. Toshihiko Kanazawa*, of Marin Seismology Department welcomed me and gave me an introduction about the major activities, the administration and the ongoing projects of the Earthquake Research Institute (ERI). The mission of the ERI has been to investigate earthquakes and volcanic eruptions and to develop methods mitigating disasters caused by earthquakes. ERI played a leading role in the establishment of modern seismology in its long history exceeding 75 years since 1925.

Mr. Taku Urabe, Assoc. Prof., Seismology, explained and showed me in practical in the laboratories, how quickly the actual earthquake data are being collected through the satellite and being recorded 24 hours continuously in this Institute form some 225 observation stations scattered all over Japan. I experienced the modern communication and multi-channel recording system in the laboratory. The well-designed computer programs could readily analyze the data by informing us the time, duration, magnitude, location, etc., of an Earthquake, which may has just occurred a few seconds before, may be at the other end of Japan. For this work, the ERI is taking help from other several national universities of Japan. Research works are being carried out in all those universities by using the recorded actual earthquake data from the ERI.

After that Prof. T. Kanazawa took me to the laboratory of the Marin Seismology Department and explained and showed me the modern and sophisticated devices, which were being designed and made in their laboratory to record and collect the earthquake data from under the deep sea/ocean at far distances from the shore. The whole process seemed to me quite expensive and very difficult to perform with good precision. However, the ERI is doing its research works of earth quake prediction and volcanic eruption prediction, and are promoting the prediction research cooperatively with related researchers throughout Japan.

Prof. T. Kanazawa also showed me a good number of panels placed in the lobby of the Institute and explained me about some projects on the other Earthquake and Seismology related activities of the Institute. Among those were various cooperative studies, such as seismic observation in several inland areas, seismic and geophysical observations in the ocean, application of Global Positioning System (GPS), seismic observation by a network covering the whole of the western Pacific under the Poseidon Plan, and experiments on volcanic structure and magma supply system etc.

2.3 Building Research Institute

In the morning of October 08, 2002, I visited the Building Research Institute (BRI), an Independent Administrative Institution of Japan in Tsukuba. *Dr. Hideo Fujitani,* Chief Research Engineer, Department of Structural Engineering of the Institute welcomed me and gave me an introduction about the activities and the administration of the Institute. A brief video film was also shown on the activities and research of the different Departments of the Institute.

The BRI is carrying out research works to identify what is to be done for people to make their lives and society and their environment deeply concerned more comfortable. The Institute is determined to research and develop to realize their comfortable lives by use of science and technology skill at the stance of impartial neutral. The achievements and results of the research

and development are presented not only to research specialists through reports and papers but also to general engineers in the form of technical guideline and recommendations. The BRI is the largest institute in Japan to perform research and development activities in the field of building engineering and technologies. Such technologies contribute to the development of construction technologies in Japan and abroad. Other activities include international research collaboration with foreign countries, providing technical cooperation for developing countries, collaboration with private companies, and publishing research information.

The Institute has six Departments out of which I visited only the Department of Structural Engineering. Dr. H. Fujitani explained me the major projects being carried out at present in his department. The main one was US-Japan Cooperative Research Program on Auto-adaptive Media (Smart Structure System). The project is to be completed by 2002. The main research targets of the project were, 1) Concept and performance evaluation methods of smart structural System, 2) Sensing and monitoring of structural performance, and 3) Development and evaluation of structural elements using smart materials. Out of several types of laboratory tests carried out for the project, the interesting one was Large-scale Shaking Table Tests were performed on building models using Magneto-Rheological (MR) Damper This large-scale experiment test verified the application to smart structures, and useful experimental results were obtained for the settlement of future research. As one of the test results, the researchers verified that an MR damper can reduce the response displacements while reducing the response acceleration.

The other three research works were being performed are: Research and Development Programs on Timber Structures; Research and Development on Performance Evaluation and Structural Control Methods for Building with Soft First Story to Ensure the Seismic Safety; and Establishment of Evaluation System for Wind Load by Natural Index of Roughness Category.

After that Dr. H. Fujitani showed me some of the projects and laboratories of the Institute. I was shown a unique model of a full-size Japanese Style House for earthquake response research works. He also took me to the laboratories of the Structural Engineering Department specially the Large Size Structural Laboratory. I was surprised to see the Laboratory in which a full-size eight-story building of about 400 sq-m can be tested by 3-D Loadings as this laboratory houses the largest reaction wall in the world of size 25 m tall, 20 m wide, and 6.8 m thick. I also saw a remarkably big 2,500 ton capacity universal testing machine, 1,000 ton capacity vertical loading testing device, and an unique arrangement of six actuators to act simultaneously to perform 3-D reversible loading tests.

Then *Mr. Namihiko Inoue*, Senior Research Engineer, Department of Structural Engineering of the Institute showed and explained me some research works facilities of the Building Foundation and Ground Laboratory. The main purposes of the research works

performed in this laboratory were Disaster Prevention, and Development of new Building Foundation Technology. The Laboratory was equipped with many facilities out of which some remarkable ones are, Large-scale Shear Box, Hydraulic Actuator, Clam Shell Bucket and High Speed Data Processing System. My attention was drawn to the Large-scale Shear Box, which was 3.6 m wide, 10 m long, 5 m high and it has the multi-story structure that piled up 17 square frames of H-steels of 300 mm x 200 mm. A separate displacement is to occur between the two adjacent frames smoothly, and many rollers work to achieve it. Some rollers were placed between the longitudinal sides of the shear box and the pit wall to restrict lateral deformation and to maintain the plain strain condition. The first system in the world to coexist the high-quality sealing performance and the low shear resistance has found application. A uniaxial simulator is equipped in the pit to conduct tests for foundation and grounds during earthquakes.

2.4 Public Works Research Institute

In the afternoon of October 08, 2002, I visited the Public Works Research Institute (PWRI), another Independent Administrative Institution of Japan in Tsukuba. *Mr. Yoshiki Tanaka,* Staff, Planning Division of the Institute welcomed me and gave me an introduction about the activities and the administration of the Institute. The Institute has a long history of more than 80 years as a government research institute for comprehensive research and development on Civil Engineering. Only last year, it has become an Independent Administrative Institution. The PWRI is the largest institute in the field of Civil Engineering in Japan to perform research and development activities in the field of civil engineering technologies. Such technologies contribute to the development of construction technologies in Japan and abroad. More specifically, the PWRI conducts fundamental and applied research in such fields as highway engineering, river engineering, erosion control, dam construction, wastewater treatment, and construction machinery. Other activities include international research collaboration with foreign countries, providing technical cooperation for developing countries, collaboration with private companies, and publishing research information.

Out of 51 large-scale laboratories of the Institute, Mr. Y. Tanaka selected four laboratories for me and took me first to the Foundation Engineering Laboratory where *Mr. Masahiro Otsuka,* Senior Research Engineer of Foundation Engineering Research Team showed and explained me some research works and facilities specially on research on the Pile Foundation. Here I first time became acquainted with the Micropile concept. Research works are being carried out here to increase the deteriorating bearing capacity of the existing pile foundations especially of old bridges by using additional Micropiles. Few numbers of big and small soil pits and other related loading devices were seen being used for research work.

Then I went to the Earthquake Engineering Laboratory, where I observed the facilities for dynamic testing of full-size structures. Numerous equipments are present there for earthquake engineering related testing, including a 30 mega-newton universal testing machine, four 2 m by 3 m single-degree-of-freedom shaking tables, and one 6 m by 8 m two-degree-of-freedom shaking tables. During my visit, I saw the laboratory is being utilized for experimental studies on dynamic strength and ductility of structural elements of lifeline facilities such as highways. The main laboratory has a test pit with large reaction walls and reaction floor and a large-stroke dynamic actuator, two regular dynamic actuators and several other loading devices.

After that I went to the Structural Engineering Laboratory. There I saw very big reaction wall and loading devices, which facilitates large-scale loading tests. A project was being carried on to check the present strength and usability of the 30/40 years old reinforced concrete bridges in Japan. Here the components of the bridges being tested were bridge deck and girders. One of the target of the research work was to find the way to strengthening the deck and girders of the old bridges being used in the country. Another project was going on to determine the effects of the saline water (see water) on the corrosion occur in the reinforcing steel in the structures.

Finally I went to the Structural Dynamics Laboratory. In these laboratories I also witnessed some dynamic loading tests of the old bridge deck by using quick repeated loading of vehicle tyres of H20 type loading. Here also the samples of the specimens being tested were the deck portions of some 30/40 years old bridges.

I was told by the research engineers of these last two laboratories that Japan is now facing sever problems in maintaining the old bridges, which were constructed in 1960s when there was a acute shortage of reinforcing steel for concrete construction works. At that time, the concrete sections and the covering of the reinforcing steel were reduced to the optimum level to manage the shortage of the reinforcing steel. Now these structures have become a headache for the maintenance engineers. The Public Works Research Institute playing an important role to find the appropriate way to maintain or to demolish such type of old bridges of the highways.

2.5 Railway Technical Research Institute

During the whole day of October 09, 2002, I visited the Railway Technical Research Institute (RTRI), at Kunitachi. *Dr. Fuminao Okumura,* General Manager, Planning Division, Maglev Systems Development Dept. of the Institute welcomed me and gave me an introduction about the activities and the administration of the Institute. A brief video film was also shown on the activities and research of the different Departments of the Institute. The main objective of the RTRI is to perform continuous research and development works to modify and update the Design Specifications for the Japan Railway (JR) in every ten years. The RTRI is the only

institute in the field of Railway Engineering in Japan to perform research and development activities in the field of railway engineering and technologies performing – Research and development to create the railway technologies of the future, Development of practical technology, Basic research on railway technology, and Development of magnetically-levitated transport systems (project). Such technologies contribute to the development of railway construction technologies in Japan and abroad. More specifically, the RTRI conducts fundamental and applied research in the field of railway engineering to make – Highly reliable railway, Low-cost railway, Attractive railway, and Environmental-friendly railway. Other activities include international research collaboration with foreign countries, providing technical cooperation for developing countries, and publishing research information.

As an expert of the MAGLEV, which means "superconducting MAGnetically LEVitated vehicle", Dr. F. Okumura explained me about the latest development on the very high speed Maglev system of new concept railway to be introduced in Japan. The research is being carried out since 1962. After long time of continuous research and effort they have introduced MLX01 type Maglev and in the Yamanashi Maglev Test Line, the latest developed MLX01 Maglev vehicle has attained a speed of 552 kmph, which is a record speed for any railway system.

Though there are about 12 different Divisions for different technology, and as I had an interest on the Structures Technology Division, I was introduced with *Dr. Osamu Murata*, General Manager, Structures Technology Division. During our discussion, Dr. O. Murata briefly explained me about the major ongoing projects and activities of his division.

Dr. F. Okumura took me to some of the laboratories of the institute and explained the activities and use of the laboratories. There I visited – High-Speed Rolling Stock Test Plant, Three-Axis Rail Fastening Device Fatigue Testing Machine, Tunnel Lining Model Testing Machine, Twin-Disc Rolling Contact Testing Machine, Dynamic Track Loading Car, Rail Fatigue Testing Equipment, Large-Scale Rainfall Simulator, etc. Unfortunately there was no practical research works were being performed at any of these laboratories at that time of my visit.

In the afternoon I was given a series of lectures by the following five researchers of the Structures Technology Division on different subject related to the research of their respective field.

Mr. Tottori Seiichi, Senior Researcher, lectured on Concrete Structure. He explained that the main objectives of their research work are to prepare Design Specification and finding way how to maintain the existing structures. Now days they are recommending the use of High Strength Reinforcing Bars and Fiber Reinforced Plastic (FRP).

Dr. Ichiro Sugimoto, Senior Researcher, lectured on Steel & Hybrid Structure. Other than the preparation of the Design Specification and finding way how to maintain the existing structures, in his speech, Dr. I. Sugimoto talked about the development and use of Steel-Fiber Reinforced Concrete (SRC) and Concrete Filled Tube Structures (CFT).

Dr. Xiu Luo, Senior Researcher, lectured on Foundation & Geotechnical Engineering. There are four groups in this field of Foundation & Geotechnical Engineering namely – Geotechnical Engineering, Earthquake Engineering, Maintenance Engineering, and Foundation Engineering. An interesting topic was talked in his speech about finding a unique way to reuse the mud (almost liquid) generally thrown away after any excavation work. The disposal of such mud is also costly and laborious work in Japan. Dr. X. Luo invented the way to reuse the mud by mixing sand and cement with it and use as a filling material again.

Mr. Arai, Senior Researcher, lectured on Tunnel. He also explained that the main objectives of their research work are to prepare Design Specification and finding way how to maintain the existing tunnels. They have introduced the Novel calculation model for shield tunnel – a calculation method called "Two-ring-beam and spring model". Research works are being done on - typical tunnel deformations, adjacent works to existing railway tunnels, and deep underground development for railway and stations.

Mr. Yasushi Takei, Senior Researcher, lectured on Architecture. Other than the preparation of the Design Specification and finding way how to maintain the existing structures, in his speech, Mr. Y. Takei talked about the development and construction of user-friendly railway stations. He talked about the design of the station buildings to be more acceptable temperature for the people without using more energy by allowing the circulation of the natural air. He also talked about the safety and comfort of the passengers during passing out and getting in the platforms, safety against fire, and the future plan of introducing computerized guide-system for the handicapped passengers.

2.6 Institute of Technology, Shimizu Corporation

In the morning of October 10, 2002, I visited the Institute of Technology, Shimizu Corporation. *Dr. Takashi Tazoh,* General Manager of Civil Engineering Department, welcomed me and gave me an introduction about the activities and the administration of the Institute. A brief video film was also shown on the activities and research of the different Divisions of the Institute. After that I was introduced to *Mr. Yasumitsu Watanabe,* Deputy Director, Civil Engineering Division, Shimizu Corporation (Head Office).

The Shimizu Corporation was established in 1804 and is one of the oldest, largest and leading engineering/construction companies in Japan with extensive international operation. I

am well acquainted with Shimizu Corporation in my country as Shimizu Corporation has a permanent office and is also working continuously in Bangladesh form the early day of the independence of Bangladesh.

Established in 1945, the Institute of Technology, Shimizu Corporation is the core of the corporation's technology related research program. The Institute has several divisions, which concentrate on the areas of – engineering research, construction engineering, structural engineering, geotechnical engineering, environmental technology, facility engineering, information technology, planning engineering, advanced technology and technology development engineering. Research and development is conducted for Shimizu projects and joint projects for other organizations while Shimizu's consulting practice offers appropriate advice and technical assistance. At Shimizu Corporation, they intend to organize original, creative research and development activities in the future under the slogan of "Progress and Harmony", so that they will be able to not only achieve technological advancement and space expansion, but also realize coexistence with nature under all circumstances.

Dr. T. Tazoh took Mr. Y. Watanabe and me to some of the laboratories of the institute and explained the ongoing research activities and use of the laboratories. My attention was drawn specially towards the nit and cleanliness of all the laboratories and the way they have arranged all the equipments and tools in excellent workable way in the laboratories. I saw the 6 Mega Newton capacity structural testing machine in the Structural Testing Laboratory, Boundary-layer wind tunnel for wind resistance experiments, Shaking table of Geotechnical Centrifuge Laboratory, High performance electromagnetic anechoic double chamber, Molecule-level indoor air testing in a clean room, Roof top garden with light soil to minimize the roof temperature, etc.

At the end of the visit I was introduced to *Dr. Tadahiko Okumura*, Deputy Director of the Institute of Technology, Shimizu Corporation.

2.7 Construction Site of Omiya Underpass, Shimizu Corporation

In the afternoon of October 10, 2002, *Mr. Yasumitsu Watanabe*, Deputy Director, Civil Engineering Division, Shimizu Corporation (Head Office) guided me to the construction site of Omiya Underpass. At the site, *Mr. Mitsuru Shimoma*, Chief Engineer, Site Representative, welcomed me and gave me an introduction about the project as well as the way of construction and the present situation of the project. This is a project to construct a portion of the Omiya Expressway under the existing line of Tohoku-Joetsu Shinkansen Railway. The portion of the 222 m long expressway that is being constructed by the Shimizu Corporation is composed of 6 numbers of mainly two storied Reinforced Concrete Pneumatic Caissons of about 23.6 ~ 46.0 m

long, 18.5 ~ 26.8 m wide, and 29.8 ~ 37.7 m deep. The repeated casting and driving of caissons were done alternatively. The difficult side of the construction work was how to excavate the soil under the caissons at those depths and how to resist the incoming ground water into the bottom of the caissons. Creating high air pressure under the cessions during excavation of the soil and unmanned robot type dragging equipments were used to solve these problems. Some times, specially trained human experts were sent to work under high air pressure with proper precautions when necessary.

Mr. M. Shimoma took us into the site and showed how the very difficult construction work was going on. At the time of my visit, I found that all the six cessions were already been driven. The remarkable construction work I found to be going on in the site was the process of transmitting the load - of one pier with two piles of the existing railway line structure - on to the adjacent two caissons, cutting the total length of the piles and the excavation of soil around the piles under the pier. Another difficult work of cutting and displacement of the intermediate walls of each two adjacent cessions was also going on.

At the end of the visit, I was shown the video films of the unique way of the driving of the Concrete Pneumatic Caissons along with some of the other major and important components of the construction works.

2.8 Construction Site of Yokohama Underground Railway Station, Obayashi Corporation

In the morning of October 11, 2002, *Mr. Hideki Kawamura,* General Manager, Technology Department No. 4, Civil Engineering Technology Division, Obayashi Corporation (Head Office) came to my hotel and guided me to their construction site of Yokohama Underground Railway Station.

The Obayashi Corporation is one of the leading engineering/construction companies in Japan with extensive international operation. I am also well acquainted with Obayashi Corporation in my country as they were/are engaged with the construction of some major bridges under Japanese Grant Assistance in Bangladesh for last several years.

At the site, *Mr. Sato,* Chief Engineer, Site Representative, welcomed me and gave me an introduction about the project as well as the way of construction and the present situation of the project. This is a project to construct a totally underground five-story railway station of JR beside the present Yokohama Station for a new JR Line called MM21 Line presently being constructed. The Yokohama Station in a very busy one and will be more and more after opening of the new MM21 Line. Approximately 1,900,000 passengers and 4,000 trains will run per day through this station.

The project was started in March 1996 and is scheduled to be completed in March 2004. The underground five-story railway station building is about 230 m long, 25 m wide, and 25 m deep with two small rivers passing on the either end side. Actually some portion of the station building is being constructed just under the river. The very low depth of the station building was due to the passing of the MM21 Line under these two rives.

During the construction, especially designed excavation/cutting equipment was used to cut and dig the either longitudinal sides and then 850 mm thick and 35 m deep reinforced concrete walls were constructed to protect the soil during excavation. A total of about 170,000 cu m volume of earth was excavated.

Mr. Sato took us into the site and showed and explained me how the very difficult and massive construction work was going on. The construction of the major components was almost completed. I saw the placing of reinforcement bars the bottom most (B5) floor about to be completed at one end of the station building and also witnessed the construction of the platforms for the passengers has been started at the B5 floor. I was surprised by seeing the massiveness of the concrete volumes for each of the components of the structures. Mr. Sato explained me that, the total volume of concrete used in this construction was about 58,000 cu m, the total amount of reinforcing bars used was 5,800 tons and the total weight of the steel structures use was 6,000 tons. I was quite satisfied with the visit to the site as I could see such a massive RC construction work in detail.

2.9 Kajima Technical Research Institute

In the afternoon of October 11, 2002, I visited the Kajima Technical Research Institute (KaTRI). *Dr. Hiroshi Abe,* Deputy Director of the Institute welcomed me and gave me an introduction about the activities and the administration of the Institute. A brief video film was also shown on the activities and research works of the different Departments of the Institute.

In 1840, Kajima first started its business in Tokyo and now it is most probably the largest and leading engineering/construction companies in Japan with extensive international operation. Kajima was the first construction company in Japan to establish a technology research center (opened in 1949), the developments and technologies from which have contributed extensively to advancements in the civil engineering and architectural fields.

Dr. Tsuyoshi Ikeya, Group Manager, Structural and Offshore Engineering Group, Civil Engineering Department and *Mr. Fujii,* Researcher, Structural and Offshore Engineering Group, Civil Engineering Department, took me around and we visited some of the laboratories of the institute and they explained me the present activities and use of the laboratories.

Out of total 4 complexes of KaTRI, I could only visit some laboratories of Tobitakyu Complex and Nishichofu Complex. In Tobitakyu Complex I visited only the Large-Structure Testing Laboratory. There I saw a testing of large-scale composite beam column structure. I also saw a vehicle (Geo-Explorer) fully equipped with modern equipments and computers to investigate soil and perform geological testing. I was told that this vehicle was used extensively just after Kobe Earthquake.

Then I visited the Nishichofu Complex of KaTRI. There I visited – Large-size structural testing laboratory where experiment can be done on large structures with 6 Degree-of-Freedom loading apparatus, 6-Degree-of-Freedom Shaking Table of remarkable size, Wind-Tunnel Laboratory, An actual three-story building with base isolators and dampers to resist earthquake damage, Roof-top garden with light soil to prevent heat absorption in the buildings, etc.

At the end of the visit, I was given lectures by two Senior Research Engineers of the KaTRI on two different subjects related to the research of their respective fields.

Mr. Satoru Nagai, Senior Research Engineer, lectured on Structure and Aseismic Technology related to Building Engineering. He talked about the High Rise Reinforced Concrete Building having Tube and Core Wall, High Strength Concrete with 600kgf/cm2, Seismic Retrofitting Shear Wall using Kajima Concrete Masonry Method, etc.

Mr. Takashi Nozawa, Senior Research Engineer, lectured on Earthquake Motion. He talked about Strong Motion Prediction taking account of Fault Slip Uncertainty, Exploration Technique using Microtremors for determination of Deep Subsurface Structure, etc.

3. CONCLUSION:

Comparing civil engineering in Bangladesh with that of Japan shows many different, the main is in the scale and size of the projects. Japan has only 20% of its land a very limited space to construct the their infrastructures and other facilities, so their main objective is to save the space and utilize the underground and construct high-rise structures. Earthquake force is something we do not always consider in Bangladesh, but we must consider the wind force as it occurs during cyclones in Bangladesh.

At the first day of my visit, when I visited the JSCE Head Office, Mr. M. Matsuo, Secretary General of JSCE, inquired me about the practical and major problems faced by the Bangladeshi engineers in the field of engineering and construction. I informed him that Bangladesh is a land of rivers and the average altitude of whole country is only a few meters above the mean see level. Here the major problems being faced by the Engineers are mostly in the water sector such as Water Management, Flood Control, River Protection and Dragging Problems etc. Mr. M. Matsuo suggested that if IEB thinks it necessary, the JSCE is ready to

send some of their experts of the above-mentioned fields to give some lectures in the seminars about their experience in Japan and exchange the know-how and thus we can enhance our mutual understanding. I thanked him for his proposal and assured him that I will covey his proposal to the officials of IEB.

During the whole tour program, *Mr. Tsuyoshi Hashimoto* and *Mr. Naoyuki Kumagai* of International Affairs Section of JSCE guided me alternatively to the different places I visited during all those five days. I would like to express my thanks to them for there kind efforts. I also express my deep gratitude to all the members and officials of JSCE to give me the chance to visit Japan on the Study Tour.

Finally I must thank the officials of IEB to select me as the recipient of the JSCE Study Tour Grant 2002 to Japan.

Annex: Itinerary DR. S.M. PARVEZ MOHIT (Oct.6 – 13, 2002)

Date		Time	Place to visit	Arranged by
Oct.6	Sun.	17:35	Arrive at Narita (SQ12)	
Oct.7	Mon.	9:30-10:30	JSCE Briefing of the Tour and JSCE (Yotsuya, Tokyo) Mr. Furuki (Chief Executive Director) Mr. Matsuo(Secretary General) Mr. Suzuki (Manager of Internartional Affairs Division)	JSCE
		13:30-17:00	Earthquake Research Institute, University of Tokyo (Hongo, Tokyo) Visit Earthquake Ovservation Center and visit laboratories Dr.Kanazawa (Professor of University of Tokyo) Dr. Urabe (Associate Professor of University of Tokyo)	Mr. Watanabe, University of Tokyo
Oct.8	Tue	10:00-12:00	Independent Administrative Institutions Building Research Institute (Tsukuba) Mr. Fujitani (Senior Researcher)	Mr. Fujitani Ms. Goto
		14:00-17:00	Independent Administrative Institutions Public Works Research Institute(Tsukuba) Discussion on infrastructures of Industrial zone and visit laboratories Mr. Ikushima (Deputy Director of Planning and Research Administration Department)	Mr. Ikushima Mr. Tanaka
Oct.9	Wed	10:00-17:00	Railway Technical Research Institute (Kunitachi, Tokyo) Given a Given a lecture of related to Steel Structures and visit laboratories	Dr. Okumura Railway Technical Research Institute
Oct.10	Thu	9:00-12:00	Shimizu Technical Research Institute Given a Given a lecture of related to Steel Structures	Mr.Watanabe (Shimizu)
		13:30-17:00	Shimizu Corporation Construction Site （Arranging) Discussion on urban development and equipment supply for construction	

Oct.11	Fri	9:30-11:30	Obayashi Corporation Construction Site （Yokohama station RC structure Project-Yokohama) '+81-45-461-0203	Mr.Kawamura(Obayashi)
		14:00-17:00	Kajima Technical Research Institute, Kajima Corporation (Chofu, Tokyo) Discussion on Steel Structures, and Visit laboratories Dr. Abe (Deputy Director of Kajima Technical Research Institute)	Dr.Abe (Kajima)
Oct.12	Sat		Free day	JSCE
Oct..13	Sun	12:00	Departure from Narita (SQ997)	