2019 CE Symposium

Disaster Reduction and Recovery

07

FSO UPDATE

2019 CE Symposium
Disaster Reduction and Recovery

Contents

Preface

To encourage international activities in the University of Tokyo, Civil engineering Department, ISACE was established on March 11th, 2011 after the great east Japan earthquake. The purpose of ISACE is to bridge the gap between international students and the civil engineering department and to make their journey at University more pleasing and comfortable. It also arranges events, connecting the alumni with current students, to advise them about life in Japan and especially in the civil engineering department. The main annual event of ISACE is to arrange the symposium, to impart the knowledge from industry-oriented people to the graduate students. This year, the theme of the symposium was "Disaster Reduction and Recovery". This symposium was conducted in association with World Banks where various speakers from academics as well as industries were invited to give keynote lectures.

Disasters are unavoidable in this world but how do we tackle with it to minimise the loss is something humans can control by having proper strategies. After the great east Japan earthquake, different strategies were applied in order to build up the area again. To see the situation even after 8 years and countless measures, a study tour to the Tohoku region was organized for students of the civil engineering department. The reports by 3 students were presented during the symposium conducted.

Japan, as one of the most technologically advanced nations in the world, provides great learning for other countries on how to have a better disaster management plans to minimize the loses. It was a good chance to know what kind of strategies were used during the great east Japan earthquake and what all needs to be done to be safer in future. Ms. Julie Dana and Ms. Bernice discussed the practical issues in implementing different strategies by organizations like the World Bank.

We would like to thank the Foreign Student Office (FSO), Professor Fuse Takahashi, Associate Professor Tomonori Nagayama and Associate Professor Yoshihide Sekimoto for their enormous support to ISACE in organizing this event. We would like to extend our thanks to Ms. Shoko Takemoto, Ms. Sayaka Yoda, and Ms. Thimali Thanjua from World bank for their valuable time and support. Last but not least, we would thank all the student presenters for sharing their learnings from the field trip and all the students who participated and gave their valuable comments during the Panel discussion.

Sincerely,
Rahul Garg, President
Lin TsenWei, Vice President Internal Affairs
Rinat Shaymukhametov, Vice President Design
Atsushi Ishi, Vice President External Affairs
Ahmad Ilyas, Vice President Finance
Rahedul Islam Rahe, Vice President Social Media
He Jian, Vice President Social Affairs

Session 1

20th Disaster Risk Management Seminar

Department of Civil Engineering
The University of Tokyo

Resilient Rail Project Development: Just-in-time (JIT) Services for Quito / Lima

Shigeo Araki General Manager, Underground Structural Study Department, Nippon Civic Consulting Engineers Co., Ltd

Around this world, to prevent the natural disaster such as earthquakes and conflagration, several preparations are underway to minimize the damage. In addition, population concentration in urban areas has occurred, and infrastructure development is being promoted at a rapid pace. There is a shortage of space for infrastructure development in not only developed countries but also developing countries so that the utilization of the underground space becomes more important. However, some countries, which never considered to use the underground space, have no design code for underground structure and earthquake resistant design code for earthquake region. Fire countermeasures and evacuation plans are desired in order to reduce the fear of being trapped in the underground enclosed space. Therefore, with the experience of Japan, the increase in the number of subway lines in other countries is expected. One example of it is the on-going Metro Line 2 project in Lima.

There was a knowledge exchange meeting of seismic design code on July 18 and July 19, 2017, at the World Bank's Lima Office in Peru. Four companies joined this meeting as the organizers: Nippon Koei (NK), Railway Technical Research Institute (RTRI), Nippon Civic Consulting Engineers (NCC), and Nippon Koei LAC (NKLAC). NK is the team leader of this project and is responsible for the introduction of emergency facilities and disaster prevention facilities of Japanese subway. RTRI is the role of introducing the railway design standard by using Japanese cases. NCC is the tunnel design specialist to show the earthquake damage cases of the subway and the animation of the vibration of tunnels during earthquakes, and then compared the world's seismic design code with the Japanese one. Finally, NKLAC is the On-site coordination who can speak both Japanese and Spanish. Since the participants are from various fields: practitioner, expert, and researcher. Other companies are also joined, including the World Bank, Embassy of Japan in Lima, Lima Metro Line 2 Project Team, Quito Metro Line 1 Project Team, Seismology at the Geophysical Institute of Peru, the Peruvian-Japanese Center of Seismic Investigation and Disasters Mitigation (CISMID) and etc. Therefore, the presentation materials are prepared for the specialist.

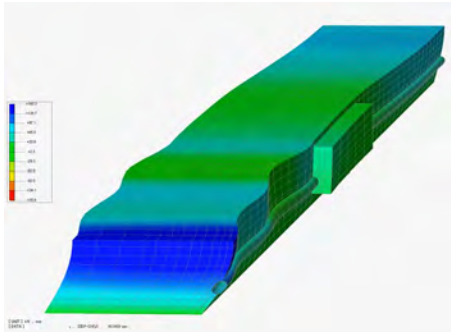
The most important issue of this meeting is to let people understand the concept of Japanese seismic design standards, especially how to decide design earthquake motion and seismic performance. There was a possibility that some technical terms might not be used in Peru. Hence, it is necessary to discuss the process with the World Bank and the local coordinators in advance and then removed the redundant parts with the confirmation of terminology by interpreters.

Nowadays, in Peru, Seismic design standards for buildings on the ground are in place. From the observation results of the earthquake, coefficients for calculating the external force during earthquakes are decided for each area. Moreover, depending on the importance of buildings, seismic design force is increased when the building such as a hospital is significant. A mark is to indicate that the building with the seismic design is safe. By receiving an explanation from a university professor at a knowledge exchange meeting, people realized this conception. On the other hand, in order to design underground structures, it is necessary to define the design ground motions underground. Nevertheless, it is still not determined.

There were 53 questions totally in the knowledge exchange meeting. Most of all are about the differences in the principle of Design Standards between Peru, Ecuador, and Japan. In Peru and Ecuador, only important structures are designed for large earthquakes; on the contrary, in Japan, earthquake motion is regarded as the same and seismic performance is changed. By considering the safety according to the importance level of the structure and the ground motion level, the performance specification can become economical during designing. Other questions are about the tunnel recovery at Okai station, such as what kind of measures were taken to prevent the tunnel from being submerged due to tsunamis or floods. The survey team was pleased since people were interested in Japanese technology.

After watching the animation of a three-dimensional structural analysis result of tunnels during earthquakes, some discus-

sions occurred, such as evacuation route and whether Japan's seismic standards can be used in Peru or not by considering the definition of seismic performance. People in Peru desire to create the seismic design standard for underground structures but they do not have any experience. As a result, they asked for information from Japan.



Japan's domestic standards are consistent with international standards, so it is easy to contribute overseas. Earthquake conditions must be carefully considered and adapted to countries. Japanese disaster prevention and Seismic Design are more advanced than any other countries and our expertise makes a great contribution to the world. Recently, Japanese Seismic Design Standard was translated into English and the consultants of preparing Peruvian Seismic Design Standard had been selected. Continuous supports and helps from Japan are requested. Now, the Japanese Ministry of Foreign Affairs will keep supporting Peru's TOR (Terms of Reference) for developing earthquake resistance standards.

In conclusion, it is necessary to determine the design ground motion during earthquakes in order to design tunnels. Through this knowledge exchange meeting, the need for creating seismic design criteria for the underground structure was clarified.

Techincal Assistance on Dam Safety Operation

Yoshihiro Yamashita Deputy Director, International Affairs Division, Water Resource Engineering Department, Japan Water Agency

In Japan, there are a large number of dams. Japan Water Agency (JWA) has contributed to building plenty of dams ever. For example, Shingu dam, Murou dam and Ikeda dam are similar to Ichari dam in their structural features. Shingu dam is a concrete gravity dam constructed in 1975 with the height of 42m, crest length of 138m, and it has 4 gates. Murou dam is a concrete gravity dam constructed in 1974 with the height of 63.5m, crest length of 175m, and it has 3 gates.

Ikeda dam is a concrete gravity dam constructed in 1975 with the height of 24m, crest length of 247m, and it has 9 gates. On the other hand, Ichari dam has 59.25m tall and 155m wide with 7 gates, constructed in 1975.

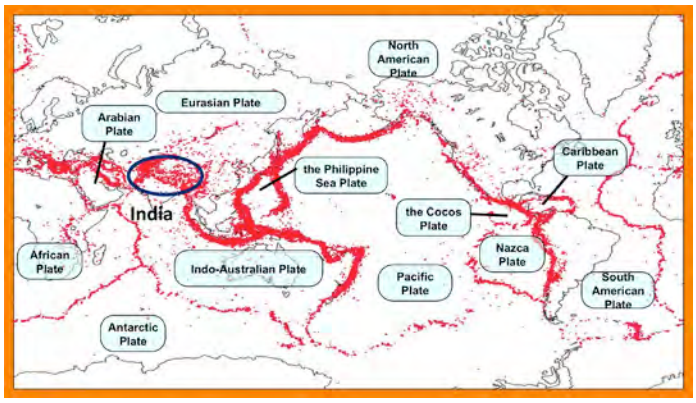
Singu dam

In India, more than 4,000 dams are constructed, which scored the third largest number of dams in the world. In China, which has the most dams in the world, there are 22,000 dams, followed by the USA with 6,575 dams.

	Country	Number of dam
1	China	22,000
2	USA	6,575
3	India	4,291
4	Japan	2,675
5	Spain	1,196
6	Canada	793
7	Korea	765
8	Turkey	625
9	Brazil	594
10	France	569
Others		7,572
Total		47,665

Source: WCD Report (2000)

Meanwhile, deterioration of dam facilities and inadequate design for spillway are the problems of Indian dams. Therefore, the Dam Rehabilitation and Improvement Project (DRIP) was carried out by the World Bank (WB). Also, North India near the Himalayas is located in an earthquake-prone zone.



Seismic-center distribution and major plates

As a collaboration with WB DRM Tokyo Office and India, they have visited JWA dams 7 times since 2015, and they also participated in the Dam safety Conference invited by CWC and WB. In addition, a Roundtable meeting with CWC Venue in WB Tokyo was held.

In case of emergency, they have conducted some counter measurement. First, emergency inspection after the earthquake was conducted to detect an early abnormal incident and to prevent damage from increasing or spreading. Second, they prepared a manual for inspection after the seismic event and mock drill.

Check list and manual of JWA

The principles of the inspection manual are

- Priority actions are clarified.
- How to observe & evaluate the dam's condition is indicated.
- The way to collect necessary data & information is shown.
- The manual is easy to understand with many photos /figures /illustrations and easy description.
- The manual is handy in size to be utilized at the field inspection.
- The reporting format is easy to fill the data/ information in.
- Preparation of the scenario for Mock Drill was conducted to clarify responsibility and action to be taken by related officials after the earthquake, and to identify any difficulties in the emergency response against earthquake in advance. In the scenario, the time, action and reporters name are written as the details.


First Inspection

In order to do better management, good points found out through field inspections. For example, inspected dams are kept in good condition in spite of aging facility. Also, necessary items are kept tidy and in order through daily inspection and O&M activities.

Here are the issues to be improved. Lack of monitoring system to check and evaluate the dam's condition, such as leakage, uplift and deformation. Furthermore, not enough back-up power generator against seismic power failure. Lack of earthquake data observation and transmitting system is also the problem.

In conclusion, further collaboration with WB and WB DRM Tokyo office is needed for future success. First, they need more technical assistance to revise and distribute the manuals in India. Another purpose is to increase resilience of dam operation and maintenance based on the results of 7th Exposure Visit. Finally, they would conduct technical assistance for other countries such as Afghanistan, in 2017 and Indonesia in 2019. Expansion of countries to assist is considered.

Department of Civil Engineering
The University of Tokyo

Provision of Just-in-Time support to Government of Sindh, Pakistan for sediment Monitoring and Analysis in the lower Indus River

Atsuhiro Yorozuya Provision of Just-in-Time support to Government of Sindh, Pakistan for sediment Monitoring and Analysis in the lower Indus River

Pakistan covers more than 880,000 square kilometers and comprises four provinces (Punjab, Khyber Pakhtunkhwa, Sindh, and Balochistan, the Federally Administered Tribal Areas (FATA), the Islamabad Capital Territory, and the Jammu and Kashmir region. The current population of Pakistan is estimated to be nearly 208 million, making it the sixth most populous country in the world. Pakistan comprises three hydrologic units: the Indus Basin, the Kharan Desert system, and the Makran coastal drainage. Most surface and the groundwater resources are in the Indus Basin. Pakistan's geography means that few interbasin transfers are economically or technically feasible. Desalination of seawater or saline groundwater can help augment supply for high-value uses. In spite of that, there are several issues interim of water resources and this part of World Bank session is about sediment monitoring and analysis in the lower Indus River and technical assistance in Sindh.

Fig. 1 Irrigation System of Indus basin

Serious Issues currently faced by Sindh,

- Accumulation of sediments in the main canals and barrages (particularly at Sukkur) affecting water delivery particularly in extremely dry weather.
- Elevated riverbed height in the main Indus leading to higher flood risks, and Fast shrinkage of the Indus Delta (particularly since construction of Kotri Barrage in mid 1960s) and the ecosystem services it provides.

Technical assistance workshops for issue faced by Sindh:

In October 7-22, 2018, in partnership with the Irrigation Department (ID) of the Government of Sindh (GoS), the Public Works Research Institute (PWRI) Japan, World Bank Water Global Practice and the Tokyo Disaster Risk Management (DRM) Hub organized a 14-day workshop and training program, held at Tsukuba, Sapporo and Tokyo on sediment monitoring and analysis of the lower Indus River.

Fig. 2 GoS delegations, PWRI experts and Ishikari River management team in Sapporo

The objective of the workshop and training was to develop a baseline survey methodology and a monitoring plan as well as better understand sediment transportation models in the lower Indus River.

This collaboration will directly contribute to the implementation of the Sindh Barrage Improvement Program implemented through financial support from the World Bank.

Ten experts attended this workshop from the government and academia of Sindh, Pakistan, who are working to strengthening disaster and climate change resilience through improved barrage operation, sedimentation monitoring and management, and integrated water resource management along the Indus River.

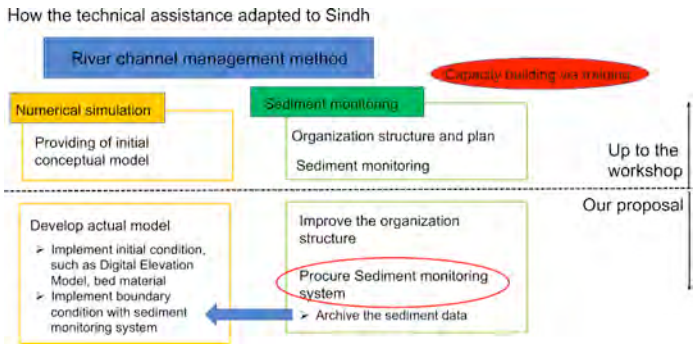


Fig. 3 Overview of the technical assistance

During the program's first week at PWRI in Tsukuba, participants learned of the various approaches to river basin monitoring and management and discussed the appropriate design of sediment monitoring plans and initial conceptual model for sediment transport and river morphology that would best suit the context of the lower Indus River and GoS Irrigation Department.

The second week of the program was a field-based training held in Ishikari River near Sapporo City. The barrage engineers were introduced to various sedimentation monitoring methods and equipments

including Acoustic Doppler Current Profiler (ADCP), multi-beam sonar, bed material sampler, and water/suspended-sediment sampler.

A wrap up session was held at the World Bank Office in Tokyo, where GoS experts shared various

Takeaways and key lessons that they envision to apply in their work to strengthen resilient water resource management, particularly on the methodology of sedimentation monitoring,

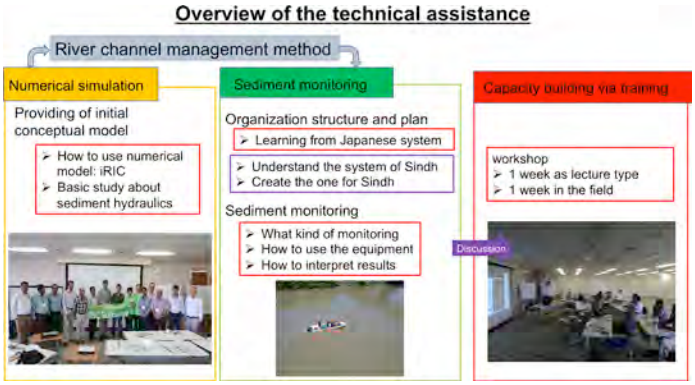


Fig. 4 Framework of technical assistance adopted by Sindh

Analysis, and evidence-based river and barrage management and planning. GoS, PWRI, World Bank Water Global Practice and Tokyo DRM Hub teams expressed their strong interest and commitment to further this partnership and discussed next steps for future collaboration.

The collaboration will directly contribute to the implementation of the Sindh Barrage Improvement Program implemented through financial support from the World Bank.

Govt. of Sindh representatives shared the context of climate and disaster risk challenges faced in the lower Indus River Basin particularly within their efforts to rehabilitate and modernize the structure of the Guddu and Sukkur Barrages. Based on opportunities, GoSindh, PWRI and the World Bank team were able to agree on a set of activities to be jointly implemented over the coming years.

These include:

- Development of a Sediment Monitoring Plan in the Sindh Part of the Indus and an Initial Conceptual Model for Sediment Transport and River Morphology
- Implementation of a Capacity Building workshop in Japan to train and develop a baseline survey methodology and a monitoring plan as well as better understand sediment.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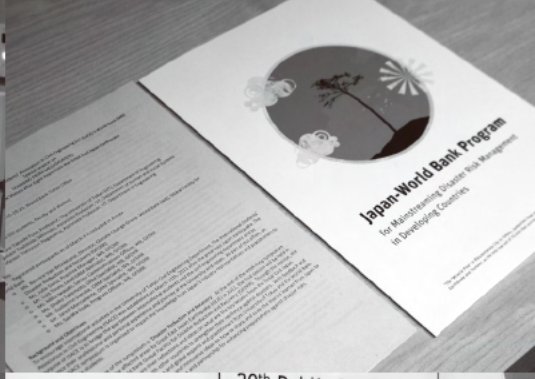
Japan-World Bank Program
for Mainstreaming Disaster Risk Management
in Developing Countries


20th Public Seminar
The World Bank Tokyo Disaster Risk Management(DRM) Hub


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Session 2

Civil Engineering Symposium 2019

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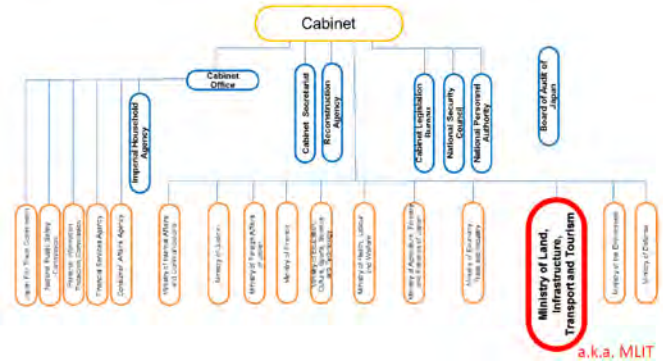
The University of Tokyo

Role of Tohoku Regional Development Bureau after the Great East Japan Earthquake

Deepanshu Agarwal Masters Student, Department of Civil Engineering, Institute of Industrial Science, The University of Tokyo, Japan

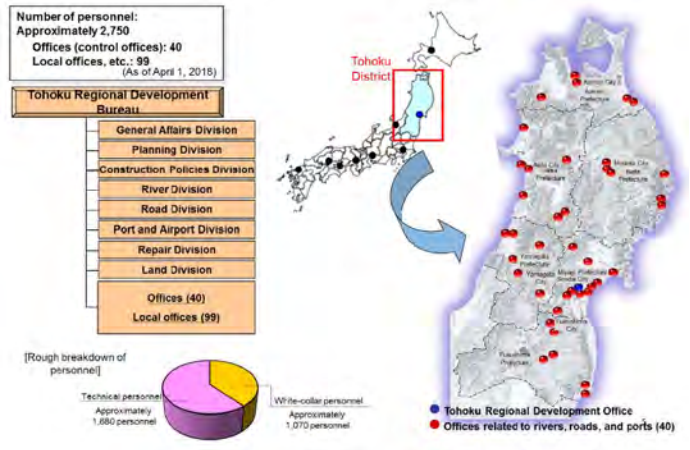
Organization of Tohoku Regional Development Bureau

Ministry of Land, Infrastructure, Transport and Tourism have the following roles:



1. The comprehensive and systematic use
2. Development, and preservation of national land
3. The consistent development of the social infrastructure
4. The implementation of traffic policies
5. The enrichment of meteorological service
6. The ensuring of safety and security at sea

Japan is divided into 8 regions and each region has its development bureau to look after its needs and development. Tohoku regional development bureau is divided into further 8 groups. It has approximately 2750 personnel. It has 40 control offices and 99 local offices.



Overview of damage in Tohoku District

Human suffering and building damage:

The maximum seismic intensity of "7" (magnitude: 9.0). Tsunamis severely damaged a wide area with a maximum run-up height of approximately 40 m. There were about 22,000 fatalities or missing persons and around 830,000 buildings were destroyed.

Fig. 1 Damage in Tagajo City of Miyagi Prefecture

Fig. 2 Damage in Miyako City of Miyagi Prefecture

River and Coastal Damage

Around 200 kilometres of coast and 1800 locations of riverfront was destroyed during that earthquake and aftershocks.

Fig. 3 An embankment was washed away from the coast in the south area of Sendai Bay, Yamamoto Town of Watari-gun, Miyagi Prefecture

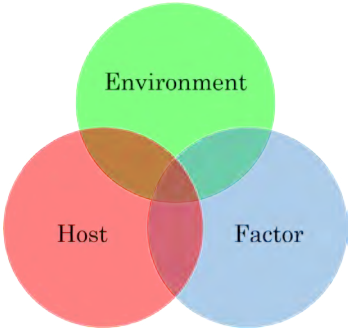
Fig. 4 An embankment on the left bank of the Naruse River subsided on a large scale,Shimonakanome of Osaki City, Miyagi Prefecture

Port Damage

9 Major ports and 14 local ports were affected.

The Tohoku Medical Megabank Project

Epidemiology has two studies namely a comparative study and a retroscopic study. In this study a total of 70,000 individuals were observed, including children, adults and people aged above 60 as well, so, it had a diversity from each age group. One unique thing in this study was it consisted of peo-



ple who were affected by the disaster immensely, and also those who weren't affected at all. Also, it was unique in the sense that it considered 3 generations in their study. For this study, blood samples, breast milk from mothers and stem cells from umbilical cords of newborn babies were collected.

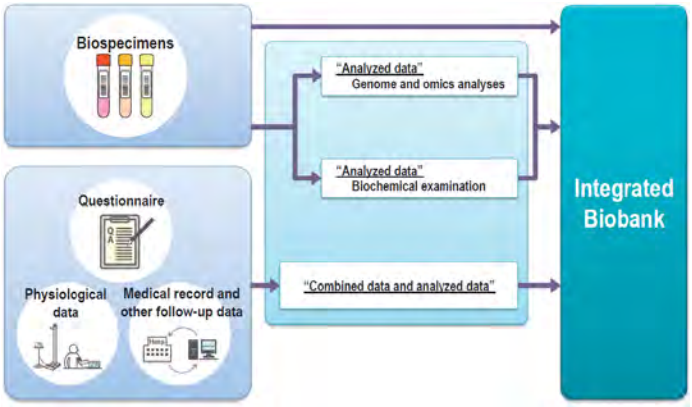
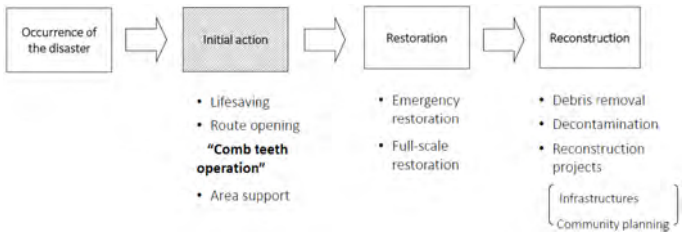


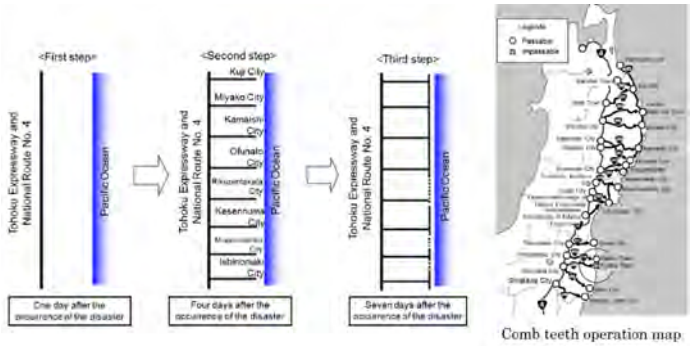
Fig. 5 Construction of an integrated bio-bank, it consists of bio-specimens and data of genome and omics linked to de- identified health and clinical information of cohort study participants

Recovery and Reconstruction

A flow chart showing the post disaster strategies by Tohoku Regional Development Bureau.



To open the roads, local people came to a big rescue. They helped clear up the roads, first in longitudinal direction then further removing debris in a traverse manner so to access cities on the coast.



Comb teeth operation map

Difficulties and Complications in Recovery and Reconstruction in the Great East Japan Earthquake

The following were the obstacles and hardships for recovery and reconstruction in Great East Japan Earthquake.

1. The Trend of Urban Planning in Post-Disaster Situations

1.1 Planning Based on the Assumption of Growth

Until 2011, the majority of Japan's previous disasters have occurred during times of growth. Growth in terms of population and wealth. Also, we all know that the trend continues even after a major disaster. For example, the land re-adjustment and urban regeneration projects usually implemented in post disaster reconstructions were based on the assumption of future land value increase. This was an effective assumption then because improvement of the urban infrastructure would increase its functionality as a city and create an influx of population from other areas, thus increasing the land price. However, currently, Japanese society is facing a declining population, ageing population and economic crisis. All of these situations suggest a need for reform of the current disaster mitigation planning methods.

1.2 The Urban Model

Tokyo is considered as the most vulnerable megacity in the world. It had been projected as the embodiment of growth. In the era of growth, it served as the model for developing and promoting disaster, mitigation planning standards. But in today's era of decline, rural regions must be considered as independent regions. Most of the affected areas followed the traditional planning trend. Kamaishi and Minami – Sanriku followed holistic approach of self-help and neighborhood support. Any help from the Government side, people consider it additional.

2. Characteristics of the Great East Japan Earthquake Recovery

There are three key features of this earthquake that are quite distinct for GEJE.

- There has been a decline in population since a peak in the year 2000, also the economy of Japan was deteriorating.
- It was a large scale earthquake. Previously, mostly the earthquakes were limited to particular prefectures. However, GEJE covered 500 kilometers of east coastline.
- The intensity of the earthquake was 9 (until now) on the Richter scale.

All these factors made it a quite unique disaster and caused problems in post disaster relief operations.

3. Lack of Freedom to Local Government

3.1 Increasing Pressures for deadlines

There was a lot of dependency on local municipalities. However, they didn't have much freedom, even though local municipalities tried their best. Recovery funds were allotted by the central government and there were budgetary deadlines for every 1

to 5 years. On the other hand, these deadlines induced time constraint on planners, which result in different short term recovery projects by the government. Therefore, the goal became adhering to the deadlines rather than exploring consensual problems.

3.2 Effective use of Bottom-up Approach in these situations

For its effective use, we have to prepare a system of total management which allow adequate time for planning and citizen participation. So, a holistic approach for each society should be applied and planning should be done accordingly.

Testimonials of Disaster Recovery from Japan

1. Fast Recovery and Shelter Options (6 Day Recovery)

Well Japan is known for its well planned and quick recovery. Even after such a massive disaster, Japanese people had retrieved major roads, sea and air routes within a week. Developing and under developed can learn a lot from its policies and planning for both pre and post disaster situations.

2. Try to put a community together for resilience buildings

Japanese Government always try to put all the people from the same community together, so as they don't feel left out that much after the loss of their dear ones. This further helps in organising and managing the society in a better way.

3. Partner Cities

This is a really good concept amongst Japanese cities. They are made partner and these cities help each other in their hard times, such as relocation of people from one city to another during the destruction of one's home.

4. Real time Tsunami Damage Assessment

Just after half an hour of hitting of the earthquake, disaster response helicopter (Michinoku) was flown to analyse the real time assessment to tsunami destructions, which is used to rescue people who are trapped, and also, it provides the information about the blockages of the routes.

5. Extraction of the people to safe site location

People since their early childhood are taught about post disaster effects and they are taught what to do during the disaster, what to do after the disaster (move to safe site location). Japanese people take this drill quite seriously and when there is any disaster people know how they have to react to this.

Also, there is a community leader, who takes care of the elderly people in the society, and check upon them whether they have evacuated their houses and are safe at the safe site location.

Conclusion

There are so many things which can be learnt from Japan, about their pre and post disaster planning and strategies for recovery and reconstruction. Even though Japan can improve in some sense, but the things that can be learnt from Japan supersedes its shortcomings. Developing and under developed countries must see how such a powerful nation operates during its hard times.

Acknowledgement

1. I would like to thank ISACE and FSO, for organising the field tour to Tohoku Region.
2. I would further like to thank the Tohoku Regional Development Bureau for giving me a vast
   knowledge about the reconstruction and impacts of GEJE.
3. Finally, I would like to thank World Bank for giving me a platform to express my views on this topic.

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Challenging the New Visions to Strengthen the Integration of Disaster Risk Management in Resilient Infrastructure toward the Sustainable Development Goals: Reflections of the Great East Japan Earthquake Impact from Ishinomaki Study

Kavalin Wangsiripaisal Doctoral Student, Infrastructure Development Laboratory, Dept. of Civil Engineering, The University of Tokyo, Japan

I am "Kavalin Wangsiripaisal" from Thailand, 1st year doctoral student in Infrastructure Development Laboratory, The University of Tokyo. We have a field trip with ISACE in the Tohoku area, the area that was attacked by Tsunami in March 2011. There are many lost both humanity and prosperity 8 years ago. As we are Civil Engineers, we should find the hidden mechanism of the problems and solve it as fast as possible in the proper ways to recovery, reconstruction, and make that society to move forward on happily.

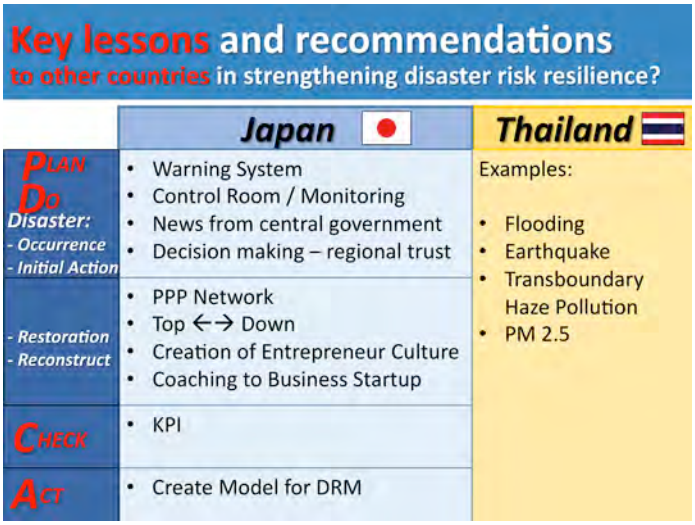
I would like to share the reflections of "The Great East Japan Earthquake" from Ishinomaki area as case study which how challenging new vision to integrate "Disaster Risk Management" toward the "Sustainable Development Goals".

The above photo is not taken from the movie. But MLIT Tohoku Regional Development Bureau shows that it is the real tsunami attacked Ishinomaki area in March 2011, which you can see from the photo that the huge wave wipe out and destroyed more than 20,000 houses and more than 3,000 people died from this impact. In our lives, how many big sadness things that we have to face them. May be only 2-3 times. But for people who live in Ishinomaki area, they have to face the huge sadness within one day. Not only sadness about the lost of their beloved family but also Ishinomaki faced the problems of unemployment rate increasing due to small businesses are closed. Depopulation and aging society will effect insufficient tax revenue for "Economic Autonomy" in long term.

Therefore, they started from protect city from Tsumami by constructing embankment and build "Evacuation Buildings" and shift habitat area to the safe zone. Then they started "Business Recovery" to reach the goals of generate new job, return to "Economic growth" and retain or increase population.

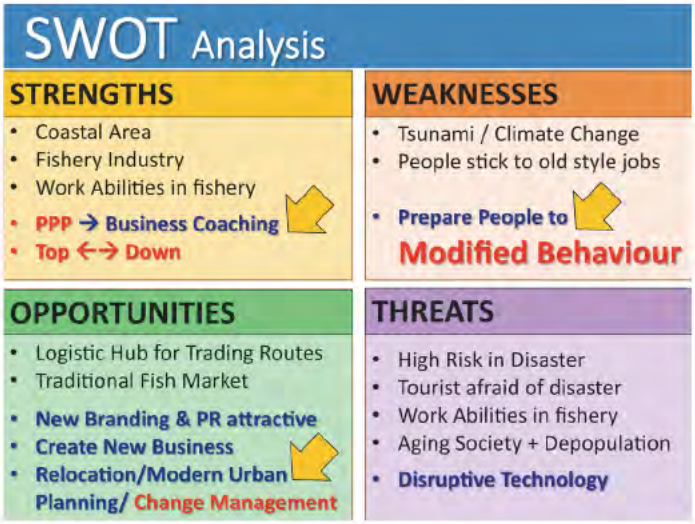
I found the key of success from Ishinomaki through their 8 years "Disaster Recovery Management" is PPP: People is the heart to concentrate on together with the collaboration of public and private sectors.

Key lessons from Ishinomaki Japan is disaster recovery and reconstruction from initial state through restoration and reconstruction such as "Warning system", "Control room" which used to monitor and brainstorming for decision making from the leader, "Create Entrepreneur Culture" to help motivation people.To study more in the interesting points are KPI and DRM Model.



To apply the lesson learnt and use the experience from Japan to solve the facing and foresee the disaster problems in Thailand and the other countries, "PDCA" can adapt to strengthening "Disaster Risk Resilience". Earthquake in Thailand happen less than in Japan but we faced to flooding problem every year and recently in the early of 2019 we faced to "Haze Pollution" of PM 2.5. This is not the problem in for any one country but it is the border countries problem. We have to share vision and set the goal to solve the problems together.

"SWOT Analysis" is a simple tool to check that which direction should Ishinomaki takes the action in order to reach the SDGs. The



result of the analysis shows that they should use "Change Management" to create "Modern Urban Recovery" rather than "Traditional Urban Recovery" and prepare people to modified behavior to use their strength and opportunity to overcome their weaknesses and treats.

The old English saying that if we give 1 fish to people, they can survive may be up to 1-2 weeks. But if we teach them how to catch the fish, they will live sustainable. That is why only spend the budget in infrastructure recovery is only one part of the whole jigsaws. Another important part is to increase "Human Capital". For example, use "Disruptive Technology" in DRM to make risk identification and risk reduction efficiency or creating new business from the previous SWOT Analysis.

Finally, I would like to thank you one of my Todai's professor Meguro, who always teaches students to find the "Hidden Mechanism" of the problem and I found the simple but powerful word is "Awareness" which is the answer that important in DRM. Sometimes we cannot stop disaster because it happens because the nature, but we can have awareness and well preparing. Moreover, the

collaboration of public private and people will be the power to help our society pass from the disaster smoothly and live happily. As we are civil engineers, try to use the civil engineering knowledge together with the geo-logical thinking and awareness to solve the global high impact problems of society as much as we can. Applied plan-do-check-act (PDCA) wisely with the good connection and collaboration work with other fields expert to create the solution to achieve the "Global challenges goal" of to make people happiness sustainable.

References: 1.) MLIT Tohoku Regional Development Bureau, Midori Maeda
2.) IBM's Smarter Cities Challenge Summary Report

Gambaro Ishinomaki !!!

Onagawa – It's Encounter with the GEJE

Vinukonda Chandra Kiran Masters Student, Department of Civiil Engineering, Concrete Lab, University of Tokyo, Japan

*GEJE – Great East Japan Earthquake

Onagawa is a small port town in Miyagi prefecture along the coast of the Pacific, surrounded by mountains and the waters. During that time, i.e., 2011, just like the rest of Japan, Onagawa was also facing problems like decline in population, youth migrating out (in search of higher education – Onagawa doesn't have any institute beyond high school, jobs or better lifestyle), and a decline in economy as it was solely dependent on fishing industry, which was also dropping, and finances based on the nuclear power plant it hosts (subsidy from the government and other small industries which run based on the plant).

On the fateful day of March 11, 2011 at 2:46 PM JST…

A 14.8-meter high tsunami wave hit the coast of Onagawa, completely destroying about 85% of the inhabited area, taking the lives of over 800 people which accounts for about 10% of the local population. Statistics show that Onagawa was the most affected municipality of the GEJE.

Onagawa – before and after the GEJE

Few days later, a reporter of The Japan times said about the situation in an article saying – 'I saw massive moulds of rubble and debris scattered across what used to be a community. The staff at the Onagawa medical centre said that the water rose high enough and engulfed the first floor of the building. Amidst the skeletal ruins of the buildings I saw cars dangling from the fourth storey roofs.'

Meanwhile, there has been another report from the Oxford student appreciating the composed, civic minded nature of the citizens, even when facing the biggest disaster the town has ever witnessed. They cited the incident where 50 workers from the nuclear reactor plant, despite knowing the dangers and the many risks affiliated with it, stayed on board the plant and helped to stabilize it.

Shortly after the disaster happened, in November 2011, Onagawa has had its new mayor **Mr. Yoshiaku Suda**, who along with FRK took responsibility of rebuilding the town. The motto of reconstruction they opted was – 'Stay, Return and Come to live in Onagawa!'. This project was named START ONAGAWA, whose aim in Mayor's own words was – 'To build a future – not a future forgetful of what happened, but a future that can move on from it.' He said in an interview that *the younger generation have been kicking their ass to make this happen*.

The events after the GEJE took quite an interesting turn in Onagawa, since it was difficult for the government to start with the recovery process. The private sector industrialists took the initiative. Masanori Takahashi, CEO of a leading fish company put the word out through Abe, a newspaper distributor, saying 'Please gather young business operators. We're going to discuss what we can do for the future of Onagawa.'

In his property, the four major business associations in Onagawa – chamber of commerce, tourism, fish processing association, fish wholesalers' association together formed FRK (Reconstruction Coordination Association) on April 19. This team contained members who were experts in various domains. FRK took necessary steps to ensure safety and smooth movement of resources. For example, a local construction company owner started clearing the rubble that blocked the roads, with his own private trucks, to enable smooth movement of vehicles that distributes necessary resources. Four days after the disaster, a road wide enough for one vehicle to pass through had been secured. In Abe's words: '*Onagawa has the spirit of self-help. We do what we can do. After the disaster, Onagawa residents took action, thinking of what we could do.*'

Takahiro Aoyama of FRK played a pivotal role in town planning with four goals – eco-friendly, should have clean water, should have food security, must be kind to children, elderly and the disabled. With his support a concrete plan for design of Onagawa took place.

The design involved stepped construction approach, to maintain the balance between disaster mitigation and the essence of sea-side living, with residential areas above 15-meter height (in accordance with the tsunami height of GEJE), and business and commercial areas above 5-meter height (in accordance with the Class-I tsunami height), and included a town centre in front of the station to allow flow of people and the traffic throughout the region.

The reconstruction plan included several beautiful structures such as

- Onagawa station
  - Designed by the Pritzker Prize-winning architect Shigeru Ban.
  - Opened in 2015 (JR Ishinomaki line).
  - Onagawa Yupo'po (traditional Japanese hot spring).
- Road tenant type shopping district
  - Sea pal-pier.
  - Hema terrace.
- Camass
  - 'Kasumi = stirring'; 'Mass = many people together'.
  - Local exchange centre.
  - The Onagawa Future Centre, Camass opened on March 28, 2015 to "facilitate gathering and exchange of wisdom from both inside and outside for the future of Onagawa.

The role of people in reconstruction of Onagawa was equally important. Often referred to as 'outsiders' by the locals, they came from outside Onagawa to help in the reconstruction of the town. One such person was **Yosuke Komatsu**, who quit his well-paying job to help the town.

He presented himself wearing a self-designed badge that said "Behind-the-scenes Supporter for the Restoration and Revitalization of the Affected Coastal Areas of Miyagi". His idea of building inns using trailer houses, to solve the problem of limited accommodation of the victims immediately after the disaster was welcomed by the authorities and was a life saver. Komatsu defined that, as "an outsider," his role would be to help local Onagawa people achieve what they wanted to achieve by bringing external resources to bear and coordinating local people as a neutral third-party. With the help from his colleagues from Tokyo, he built four such inns which he later turned into a successfully running hotel El Faro (Spanish, meaning - lighthouse), which was named after a town in Spain, who grew back after facing disaster similar to the one faced by Onagawa.

Although, this all seems great, the reconstruction process is still a long way from complete. Onagawa is still facing several problems due to

- Delays in permanent housing constructions
- Elderly people becoming impatient due to their longer than intended stay at the temporary housing which they call 'rabbit hole'
- A huge difference in reconstruction cost and disaster refund,
- Heavy cost burden on citizens, just for tourism purposes (as said by an elderly citizen)

To mention another important aspect, festivals. Often neglected aspect of a disaster is the trauma of the victims. Onagawa town has taken special care in organising various festivals and events uniformly throughout the year to help and encourage the victims to move on from the horrible past into a hopeful future.

I'd like to conclude the report on Onagawa citing a poem written by a then elementary school kid, which turned into a slogan for START ONAGAWA project – '*Onagawa was not swept away, it will be reborn. Without giving in, people keep waiting to live in a new Onagawa to feel joy.*'

As for the key lessons learnt, the important ones – self assistance before all, and active participation of all three sectors: public, private and government through networking; both of which can be done by establishing an educated and disaster resilient society which we must strive to achieve and it's the lesson for myself which I'll carry back to my home country and every other place I go.

Panel Discussion:

Learning from Mega-disaster: Japan Great East Earthquake

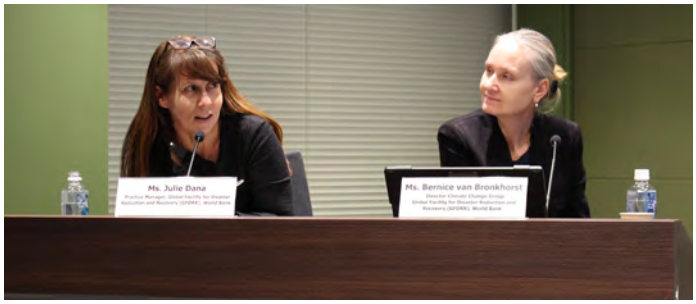
Professor Takashi Fuse / Associate Professor Youshihide Sekimoto / Associate Professor Tomonori Nagayama / Ms. Bernice Van Bronkhorst / Ms. Julie Dana,

The Great East Japan Earthquake was one of the most shocking disaster struck on March 11, 2011, recording a magnitude of 9.0. The seismic motion was devastating in a broad area, recording intensity of 7 on the Japanese seismic scale in Kurihara City, and six in various municipalities of Miyagi, Fukushima, Ibaraki and Tochigi Prefectures. The earthquake caused more than 16,000 deaths and regarding property damage, more than 12,000 cases at schools/ houses/ hospital/dam and embankment/roads/airport/sea port and others infrastructure damaged badly. The affected area trying to reconstruction to recover from the damaged. The international student association in civil engineering (ISACE), Department of Civil Engineering, University of Tokyo organized a 2 days long field trip in Great East Japan Earthquake (GEJE) area in Tohoku, Ishinomaki and Onagawa town area in Sendai prefecture to observed and experienced the reconstruction and recover status. After the field trip, The ISACE_UT and World Bank Global Facility for Disaster Reduction and Recovery (GFDRR) jointly organized a symposium on 'Disaster Reduction and Recovery'. The aim of the field visits a symposium was to gathered resilience and reconstruction experience from the great east Japan earthquake affected area and shared it with the student's national disaster resilience activities. The important part of this symposium was panel discussion season.

Panel Discussion Season: The ISACE_UT and World Bank symposium was a wonderful international networking with the expert personnel from national and international organization and students. Three students from ISACE present their experience on disaster recovery and reconstruction in the field trip areas. Mr. Deepanshu Agarwal, M1 student from Remote Senseing of Environment and Disaster Lab., present on Role of Ministry of Land Infrastructure Transport and Tourism (MLIT) Tohoku regional bureau after the great east Japan Earthquake; Ms. Kavalin Wangsiripaisal, D1 Student from Infrastructure Development and Management, presents on Challenging the new vision to strengthen the integration of Disaster Risk management in resilient infrastructure toward the sustainable development Goals: Reflections of the Great East Japan Earthquake impacts from Ishinomaki study; and Mr. Chandra Kiran Vinukonda, D1 Student from Concrete Lab, present on Onagawa- it's encounter with the Great East Japan Earthquake. After their presentation, a panel discussion conducted on presentations. The president of ISACE, Mr. Rahul Garg was the moderator of this session. In the panel discussion session, the panelist was from University of Tokyo and World Bank (GFDRR). From the University of Tokyo, Professor Takashi Fuse, Department of Civil Engineering; Professor Youshihide Sekimoto, Associate Professor, Department of Human and Social System; Professor Tomonori Nagayama, Associate Professor, Department of Civil Engineering, was present. As the panelist from world bank, Ms. Bernice Van Bronkhorst, Director, World Bank's Climate change group, Global Facility for Disaster Reduction and Recovery (GFDRR) and Ms. Julie Dana, Practice Manager, GFDRR, World Bank, was present and discussed on the presentation.

In the panel discussion, the panelist discusses on the presentation of the student. The director of GFDRR, World Bank ***Ms. Bronkhorst*** share her experience about his field level disaster recovery experience from the different part of the world with the student. She appreciates the quick and smart disaster recovery work in GEJE affected area. The disaster not only damaged the socio-economic infrastructure but also caused of mental shocked and it's need special care for mental strengthen of the affected people. The Practice Manager, GFDRR, World Bank, ***Ms. Dana*** discuss on the construction work and community participant in recovery planning work in the disaster affected area. The institutional disaster recovery agencies are not able to initial recovery stages, community and volunteers are play important role for disaster recovery. ***Professor Takashi Fuse*** discuss on the urban reconstruction procedures and monitoring system. Although, the construction work going on continuously but it's taking long time for the decision making, planning, financing and implementation. ***Associate Professor Youshihide Sekimoto*** appreciates the student presentation and share his opinion on disaster recovery system in Tohoku regions. ***Associate Professor Tomonori Nagayama*** speaks on the economic activities of the Onagawa city and the public private partnership (PPP) planning system. The presenters are mentioned the slow rate of recovery and reconstruction activities in the GEJE areas and the panelist discuss on it. The financing, public motivation, lack of man-power etc. are the main causes of the slow reconstruction speed in the areas.

The panel discussion session was a nice platform for the students to exchange the concept, opinion and experienced with the GFDRR's expert and academicians.



Panelist from *World Bank*

Panelist from *University of Tokyo*


World Bank
GFDRR
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www.worldbank.org/drrhubtokyo
www.gfdrr.org

Session 3

Invited Speakers

Department of Civil Engineering
The University of Tokyo

One Delivery – Introduction of New Blueprint for Logistics

Mohamed Batran Data Scientist, Rakuten

Mr. Moharned Batran, the former member in ISACE and student in Department of Civil Engineering, now work at Rakuten make a presentation about the "ONE DELIVERY" in Rakuten Market—aiming to bring a brand new, superior shopping experience for net-shoppers in Rakuten.

What is "One Delivery"

> *" "One Delivery" version is based on Rakuten's own network and external partners to improve service, effectively manage costs and increase capacity. "*
>
> *From Rakuten.Today*

"One Delivery" service is dedicated to providing simple and speedy purchase experience for users in only ONE step; the most efficient delivery way for merchants in ONE process; an improving service by Rakuten through partner collaboration in ONE end-to-end service.

To be specific, merchants will be able to store products in the expanding Rakuten fulfillment centers, to be picked and shipped with the aid of the latest automated systems. Customers will be able to opt for faster deliveries and not only be able to check the status of their packages but also specify the exact delivery time and method (such as pickup at a convenience store or delivery locker, or alternatively, doorstep delivery). Rakuten will utilize automation and AI to its full potential, merging delivery data and purchase data to combine deliveries of items purchased from different merchants. By boosting warehouse and delivery efficiency, Rakuten aims to cut down on both delivery time and costs for storage and transport.

Personal Tailor

The "One Delivery" becomes to outstanding and make a difference when people shopping online. This is not simply that item information will be displayed on "One Delivery" but personalized according to the customer's information from Rakuten Ichiba. When Customer chooses the items they want, it is possible for them to specify an ideal delivery time by several delivery methods and easily change the timing when customer become unable to receive their packages in the designated time.

Diverse Delivery Methods in Faster and More Accurate Way

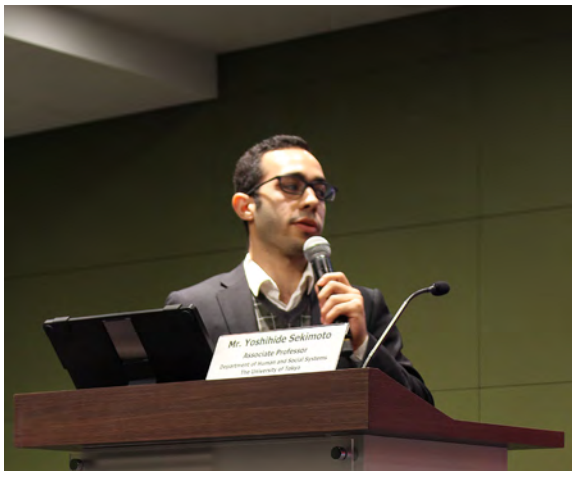
The best thing is the final delivery place is no longer restricted to our own home but can be anywhere in a convenient store or Rakuten Box. No more rushing home is needed to receive a package. Then, with the fast automating processing of package in the distribution center, the order will be sent to every shipping destination in the most effective and costless way.

Real Time Shipping Information till Last One Mile of Delivery

Additionally, the customer can understand their package delivery status until the order has been successfully delivered.

In the future, Rakuten's logistics facilities will be continuous expanded across Japan which further empowers both customers and merchants by integrating order data, logistics facilities, inventory information, and delivery network, building the future of logistics together.

One Delivery Vision



Mohamed Batran

Department of Civil Engineering
The University of Tokyo

Estimating People Flow in Combination of Sensing and Behavior Modeling

Yoshihide Sekimoto Associate Professor, Department of Civil Engineering, University of Tokyo, Japan

Associate Prof. Sekimoto Yoshihide makes a presentation about his recent research project related to people flow estimation in the combination of sensing and behavior modeling. The project overviews data process technology, data quality and its common infrastructure for people flow on a large scale.

"Recently, monitoring dynamic changes in people flow has become more important, in order to mitigate secondary disasters following earthquakes, fires or other major events, as well as to mitigate congestion at nodes in terminal station."

The professor notices that monitoring of dynamic changes in people flow can mitigate secondary disasters following earthquakes, fires, or other major events as well as to relieve congestion at nodes in the terminal station. For public facility managers to design safe and comfortables spaces, plan appropriate transport policies and most importantly, to prevent the tragedy like 311 Earthquake from repeating. Additionally, the rapid growth of urban populations may outpace the development of needed urban infrastructure, such as related to transportation, hence, resulting in the inadequacy of public transportation services and traffic congestion. The effort on the better understanding of the current traffic situation becomes fundamental to population mobility enhancement and solution to urban traffic issues.

The project utilized massive data from various resources like in GPS of mobile phone, call detail record (CDR) data IC tickets recording the number of passengers getting on and off each station… The tracking of hourly number of people enables us to measure people flow according to various dimensions.

"We propose some correction methods to resolve the difficulties in applying it to many cities and stably to infrastructure data."

Many related-researches on people movement and travel time analysis by using big data worldwide have been released at Prof. Sekimoto's Laboratory.[1] For instance, the project team leverage millions of CDRs which well describe the displacement of people in time and space to estimate urban travel time in Greater Maputo, Mozambique.[2] When Origin-Destination pair is created, travel time estimation between areas not only at the average travel time but also at different time period (Weekday non-rush hour/ weekday rush hour/ weekend).

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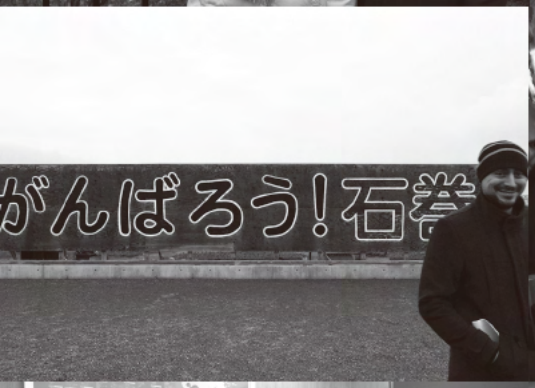
1 The research activity introduction of Prof. Sekimoto's Labortory: https://sekilab.iis.u-tokyo.ac.jp/research/

2 Main Paper: Batran, M., Mejia, M. G., Kanasugi, H., Sekimoto, Y., & Shibasaki, R.: Inferencing Human Spatiotemporal Mobility in Greater Maputo via Mobile Phone Big Data Mining, *International Journal of Geo-Information*, Vol.7, No.7, 259, June 2018.

Associate Professor Sekimoto Yoshihide is presenting the result about people movement in specific contexts in the Great Tokyo Area

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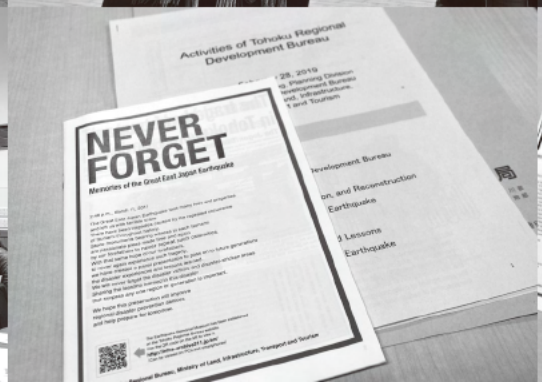
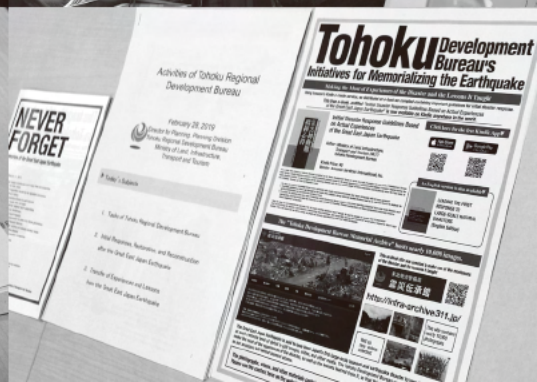

Activities of Tohoku Regional Development Bureau
NEVER FORGET
Memories of the Great East Japan Earthquake

Activities of Tohoku Regional Development Bureau
NEVER FORGET
Tohoku Development Bureau's Initiatives for Memorializing the Earthquake

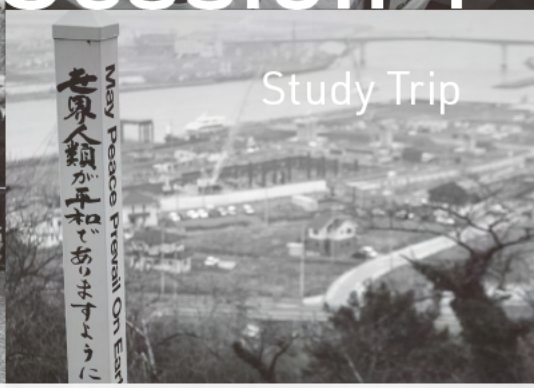





Session 4

Study Trip











SENDAI, ISHINOMAKI AND ONAGAWA: STUDY TRIP 28 Feb.—01 Mar. 2019

This year field trip's topic is "LEARNING FROM MEGADISASTERS: Reflection and New Vision after Eight Years from the Great East Japan Earthquake". ISACE with the help of foreign student office (FSO) organized the field trip to the Tohoku region which severely suffered the disaster and to learn what kind measures and precautions have been undertaking.

Sendai: Tohoku Regional Development Bureau

Our first stopover is the Tohoku Regional Development Bureau (Ministry of Land, Infrastructure, Transport) in Sendai. The most important duties of the bureau are transport regulation, methodological observation, countering accidents and disasters. The unpublished footages and videos of the Great Earthquake were shown during the visit. Later a response of Tohoku Regional Development Bureau, MLIT to the disaster was shown.

Sendai

Ishinomaki

In Ishinomaki, the Ishinomaki Hiyoriyama Park was visited where we were able to see the damaged area and reconstruction sites. The detailed plan of the next reconstruction stage and what have already done in order to protect the city from another devastating tsunami were explained and obstacles which the local government faced during the reconstruction.

Ishinomaki

Onagawa Town

On the second day, Onagawa town which was one of the most damaged communities was visited. The tsunami in this region reached about 15 meters (49 ft) in height and swept 1 kilometre (0.62 mi) inland, as a result, the disaster claimed 827 lives and destroyed 70% of the buildings in the town. The local community's and private sector business leaders' efforts helped to revitalize the town. Camass (Future Centre) was established in order to bring locals, business and other people together to help in the restoration of the town. Now, the city centre was built a business street with restaurants, souvenir stores and Ishinomaki Menamihama Tsunami Memorial Park is going to be built. "Onagawa was not washed away. A new Onagawa will be born. People continue to wait without giving up in order to feel the joy of living in a new Onagawa"

Onagawa Town

Student's Voice about the Field trip

JI Xi
M1
Concrete Lab

I am really grateful to the study trip which enables me to have a view of north-east Japan and the reconstruction work after the earthquake.

During the lecture in Tohoku Regional Development Bureau, we watched the video of the great Japan earthquake. It really shocked me by the huge power of earthquake and tsunami when I saw the villages and roads being destroyed in a sudden. Human beings are so weak in the face of natural disaster. Watching such a pretty and peaceful place being damaged is quite distressing.

The workload of the reconstruction work is large. For the continuing years till now, the government and citizens have been keeping advancing the process of reconstruction which includes the reconstruction of roads, reconstruction and extension of river embankments, restoration extension of breakwaters, the recovery of community, etc. And the majority of reconstruction work is expected to be finished at the end of March 2019. As the last stop of the study trip, we visited Onagawa Town. In the centre of Onagawa, the place used to be a residential area reborn to be business street with restaurants and souvenir stores after reconstruction. With the perfect site for watching the sunrise from Onagawa station, access to JR railway, hot spring and seafood, I believe that Onagawa has the potential to attract more tourists if they popularize the town in a wider range with more advertisements.

Considering that people need support from each other either materially or mentally, the new residential area is designed in groups in order to gather people together. That is the most impressive point for me when listening to the lectures. The rescue and reconstruction work is not only promoted in good order but also in a considerable way paying attention to many details. I learnt quite a lot from the strong-will and calmness of Japanese people after a big disaster. What's more, in the face of disaster, good cooperation and management can greatly improve efficiency. Take the road opening work after east Japan earthquake as an example, totally 52 teams from the local construction industry and various related agencies involved into the work which enabled 11 out of 16 routes to be opened only one day after the earthquake. Finally, after the earthquake, the reconstructed defence projects like embankment in Tohoku area appear to be different from before in a more reasonable and resistant way. Although we cannot stop the occurrence of a disaster, we still need to sum up as much as possible from the past disasters to get prepared for the emergency condition which might happen in the future to minimize the lost.

Kumar Avadh
D1
Nagai Laboratory

The Great East Japan Earthquake of 2011 had caused immense destruction of life and property. It was disheartening to see the great pain caused due to loss of life and displacement of citizens from their own homes. But I felt the Japanese spirit of not giving while listening to the officers talking about their reconstruction plans. The government is using this as an opportunity to efficiently plan the affected areas so as to mitigate the effect of future disasters and attract people to live there. It was interesting to understand how the planners wish to integrate existing heritage of the affected places with modern technologies and construction practices to protect them future harm. From our interaction with officers in Tohoku Regional Development Bureau, Ishinomaki and Onagawa Town Office, I could feel how emotionally invested they were in the projects to make sure that there cities and towns can be brought back to life as soon as possible. We could see a large number of sites where construction of buildings, bridges and embankments was under progress. The amount of construction and planning were done in these areas in such a small span of time was very impressive. The model adopted by Onagawa town to attract budding entrepreneurs and providing them with a comfortable place to discuss and develop their ideas was commendable. Also, the efforts to engage local residents in the planning and acknowledging their needs and ideas will be pivotal in the development of the town. However, I would recommend to also develop projects in order to attract foreign tourists and not just Japanese.

India itself suffers from devastating disasters every year. The models of planning developed by these municipalities can be effectively used to build a better life for the affected residents. The embankments built can be effectively used as beautiful riverfront and also a measure of protection against disasters.

Jami Qvisen

M1
Bridge Lab

As I am originally coming from a country where chances of natural disasters are almost zero, I don't have any prior experiences from big natural catastrophes. When we arrived at the destroyed areas in Ishinomaki, it felt quite unreal seeing the magnitude of damages and the sheer force behind the 2011 tsunami. Seeing the destroyed areas helped me to realize how horrible it must have been for the people living in the area and the amount of determination needed from rescue workers and everybody else who has been part of the reconstruction process.

Even though the reconstruction was still ongoing in some areas, a lot of repairs and improvements had already been implemented. The biggest steps had been taken in preparation for the next possible catastrophe. Resident areas have been constructed in higher areas where the risk of a tsunami is smaller, the design of coastal areas has been improved and the seawalls have been updated to withstand bigger tsunamis. For example, in Onagawa the coastal area at the city centre was raised with few meters and instead of rebuilding residential buildings next to the shore, they were moved to higher areas.

Maybe the biggest lessons I learned on the trip was the importance of proper preparation for the worst case scenario. This applies all the way from the personal level up to the national level. Even at a personal level, one can make a huge difference. Proper preparation might not prevent the disaster but it considerably helps in minimizing the damages and need for reconstruction. It also helps in saving lives and decreases the number of injuries.

Although there is no risk of earthquakes, tsunamis or other huge natural disasters in my home country, lessons learned from the Great East Japan Earthquake can be utilized in other possible catastrophes. Making good preparations and informing people how to act in case of emergency are a few examples that should be learned from the Great East Japan Earthquake. Also taking a lesson from the efficient response and quick actions of Tohoku officials during the 2011 tsunami might be really useful knowledge even in case of other kinds of catastrophes.

Hanjing Lin

M2
Sakai Lab

Japan is remarkable for its reconstruction capability and its strength when confronted with disasters. Since I came here to further my study, I encountered earthquakes, typhoons, heavy rains and so on, but none of them was as destructive as the Great East Japan Earthquake. Throughout this field trip, after watching valuable videos, photos, and witnessing real damaged areas, learning from lectures, I felt the sadness here and there but always it was accompanied by endless hope and followed by a definitely much brighter future. Nature caused tragedies mercilessly, but selfless officers stood out to think out what they could do to reduce casualties as soon as possible even without confirming whether their own relatives were safe or not, even leaving themselves no moments to feel the shock and fear. Thanks to their work, more people were able to survive and move on.

The continuously improved emergency alarm system even speeded up by one second, is extremely meaningful to the present and future generations. The rescue teams and organizations, the faster their response become and the more fluent and more well-regulated sequence their divisions are functioning in, the greater the chance more residents can follow effective instructions and thereby survive. The constructions of the memorial facilities allow people to gather up and pray for the past, present and future and learn from the past and endeavour to avoid suffering from such tragedies again. Maybe from time to time, the government can organize campaigns leading children and teenagers to go into these memorial facilities and teach them how to handle disasters.

The most touching part for me was during the lecture, Miss Maeda shared with us the reason why she chose her present work. She said she wanted to do something for Tohoku area when she heard bad news broadcast on TV then. Absolutely it is on account of the very warm hearts and kindness of people like Miss Maeda, Japan can be filled up with hope and can stand up as a strong country. And another important lesson I learned is to rehabilitate on the basis of fully understanding local advantages and then to develop with new ideas, input vivid and renewed spirits incessantly and above all, to drive residents themselves into playing necessary roles in reconstruction work positively and spontaneously. I think such smart methodologies and practices can also be applied to the development of my hometown.

I do appreciate this field trip very much since I was deeply touched by what I saw, heard, felt and what I learned.

Jacqueline Anne OSEA

M2
Oguchi Lab

Seeing the images of disaster caused by the earthquake and the subsequent tsunami, I felt I can empathize as disasters have been a natural occurrence in my home country. Moreover, I have been also a victim of massive flooding when flood that was triggered by extreme rainfall and deforestation affected my hometown, leaving many casualties and persons missing. That is why the magnitude of the loss and damage of those affected left me with feelings of despair and frailty.

Eight years after, various reconstruction and community redevelopment were initiated by the government and local communities. The Tohoku Regional Bureau was quick in their disaster response – dispatching a special helicopter to send live images to their disaster control room. With this response, they were able to grasp the situation and decide swiftly their course of action. And through the years, they continue to hone their skills and technology. With regards to structures, I was amazed by the massive seawalls that were constructed to shield high waves from coming to land in Ishinomaki City. Also, the government promoted urban development centralizing in the redevelopment of affected municipalities that focus on community development. In this plan, they involved the residents in order to help rebuild their town. Residents of Onagawa Town, the most damaged municipality by the disaster, made effort to restore the beauty of their hometown by cooperation with the government and one another. By inviting various people and brainstorming their ideas, they were able to think of solutions that were beneficial to them. In my opinion, the cooperation of government and residents should be strengthened and maintained, and in the future, I hope more people would come to see the beauty and resilience of the Tohoku Region.

What I gained from the study trip was more than I expected. I felt warmth in my heart to see how far citizens of Japan would go to for the sake of other people; how far the survivors would go for the sake of their hometown. I thought that by prioritizing development at community level after a disaster is the best way to reconstruct affected areas. By doing so, they have a support system that cannot be given by strangers – people would be more comfortable to people they know so they were able to think and rebuild their lands. All in all, it became a good experience and I hope to visit the prefecture again soon.

Chathuri Subasinghe

M1
River and Environmental Engineering Lab

Natural disasters are extreme and sudden events caused by environmental factors that injure people and damage properties. Great East Japan earthquake is the largest recorded earthquake in Japanese history and remains as a sorrowful event which caused unprecedented damage. In general, people like to interact with nature and their only hope to get blessings from nature, but sometimes unforeseen destiny may change and wash out everything they own within few seconds like a nightmare. I'm sure everyone will be reduced to tears when they see the damage of this earthquake. I admired changes and developments of the damaged areas only within eight years after this tsunami-type disaster.

Both Onagawa and Ishinomaki areas have been reconstructed according to new town plans. There, we observed new town office buildings, residential areas relocated in high lands or raised areas. Not only the residential buildings but also common areas like commercial buildings, parks, schools and railway stations have been subjected to alterations. Along with paved road networks, these reconstructed towns are well built with the contribution of all societal sectors including local people. The raising of river embankments has already been completed.

Ishinomaki city was known as a river port and many communities dwell along the river banks. Because of that, they suffered more from this disaster event. So, it is very important to construct suitable retaining walls along the river banks and there should be a management system for maintenance, not only during construction period but also after the constructions of this kind of retaining structures. This kind of redevelopment projects areas are focused as tourism sites in these cities because of that city developers pay special attention to landscaping and attractive architecture, etc. The government, private sector and local people actively contributed to town planning. The advantage of active participation of local community members is that they had more knowledge about the area than outsiders. It is very interesting to see the strong interactions between local people and officials in the reconstruction activities to build back their city for better and safer.

We gained knowledge and experience from the site visit of Ishinomaki and Onagawa areas such as "road clearance" works (Operation "Teeth of a Comb") to secure rescue and relief routes, the bottom-up approach of urban planning.

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