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International Center for Urban Safety Engineering
Institute of Industrial Science, The University of Tokyo

Recovery as it should be: the philosophy of recovery and disaster mitigation

By Yoshiteru Murosaki
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In talking about the Tohoku earthquake recovery efforts, it is necessary for us to re-determine what is meant by recovery and thus realign our perspectives on how it can be best approached for the case of Tohoku.

The dictionary defines 'recovery' as "restoring or bringing back to momentum what was in a declining state".

Further to this, in recent times, there has been a trend towards what may be termed as '*reformative* recovery' from the traditional '*restorative* recovery'. This change implies two things. One is that recovery is no longer concerned with only the built environment; it also comprises of economic and cultural aspects within it. Second is that recovery is no longer simply considered as a process of restoration where the affected area is brought back to its previous state, but rather a process of creation in which new standards and orders are defined including government and social reforms. Therefore, reformative recovery shows significant qualitative change compared to the restorative form of recovery.

This article discusses the principles of reformative recovery and how it can be best approached in the case of Tohoku recovery.

Goals of disaster recovery

There are three essential goals of disaster recovery: financial independence, safety, and reform. If any of these three are missing, it cannot be called a successful recovery.

Stepping towards recovery: This pair of photos shows the same location in Shizugawa, Minami Sanriku, June 2011 (left) and Feb 2012 (right). Rubbles that had covered the riverside have been cleared away.

The ability to financially self-support oneself is essential for people to regain confidence and work towards improving their livelihood. However, the current situation in Tohoku is that people are jobless. Without the means to sustain themselves, they cannot be expected to think about ways to sustain the community. Therefore, perhaps even more important than the housing issue, is the creation of jobs. Providing ways to earn will lead to self-reliance, and can solve the housing problems if people can earn a well-enough living to rebuild their houses without having to rely on the government. Hence the first key factor is how to facilitate financial independence as part of the recovery.

Minami Sanriku government office built temporarily on tennis court (June 2011)

Safety is the second key factor. In considering this, it is necessary to think about what is meant by 'safety.' It is of course important to save lives in the event of future disasters, but it is equally important to save the livelihood of people. In cases such as Tohoku, where people's livelihood is closely linked to the geographical landscape (e.g. fishery), there is high chance for conflicts to occur. For example, raising the height of the levee or moving to higher ground may protect the citizens from future tsunamis, but it also creates a barrier for the fishermen whose livelihood is dependent on the sea. Hence, physical safety and financial independence are essential but not sufficient. Preserving the cultural identity is equally important for the recovery of the community.

Reform is necessary at the societal level to avoid social vulnerability which tends to amplify the negative impacts of disasters. Municipality re-structuring and creation of effective organizational networks are some possible ways to bring reform.

Power of recovery

What implies a successful recovery? Is it to restore to the previous state, or bring it up to a better state? Previous recovery examples have revealed that the recovery process can produce four different spring-effects, which can lead to an improved state.

First is the promotion of an indomitable spirit among the victims. Giving people hope and courage when they are hopeless facilitates this spirit and leads to recovery.

Second is the sense of solidarity. If community connections are maintained, then mutual support can be expected. For this, it is important to provide several opportunities and options; limited choices will foster dispute and prevent collaboration.

Third is the ability to reflect and understand what went wrong. Often times, the underlying causes of disasters are embedded within the society. No doubt the tsunami caused major damage in Tohoku, but the already existing issues of declining population, scarcity of available medical facilities, and deteriorating economic growth of regional communities also contributed to impact of the disaster. Hence, to mitigate the risk for future disasters, one needs to look beyond the physical aspects and reevaluate the underlying factors.

The last is proper investment in resources for reconstruction. Proper utilization of financial and human resources will ensure the creation of a better city/town.

Conditions for recovery

There are three important approaches to consider for the progress of recovery.

One is the story-oriented approach. The victims should be the protagonists and the recovery should represent their stories, feelings, and needs. It is necessary to determine how to incorporate their requirements within the recovery plan.

Another is the step-by-step recovery approach. This calls for the division of recovery planning in phases. Planning should "descend from general to particulars". Overall recovery decisions need to be made top-down as soon as possible with the far future in mind, where as the more specific issues of neighborhood rebuilding require more time and a bottom-up initiative. Thus, recovery goals and strategies need to be divided into short-term, medium-term and long-term.

Inclusive recovery is the third approach and reiterates the fact that safety is not the only goal of recovery. It is necessary to think of livelihood as a whole, and simultaneously consider community, economy, welfare, education and the environment to realize a better society.

Principles of disaster risk-reduction

In disaster risk-reduction, working

with nature, as opposed to *against* nature, is important. And this requires a proper understanding of the relationship between man and the nature.

Against the immense power of nature, we are insignificant. And thus, taking the stance of "disaster risk-reduction" by setting standards for acceptable risk, rather than aiming for a full-proof "disaster prevention", is more realistic.

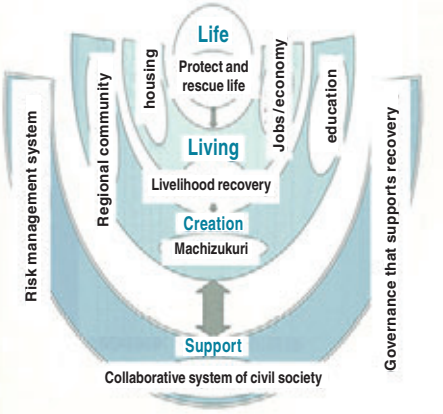
In disaster risk-reduction systems, "the *addition* of strategic measures leads to the *subtraction* of damage", and the goal of the planner is to design an effective subtraction. To achieve this, it is important to consider ways to combine different types of strategic measures: for example, how to integrate 'hard' aspects such as the structural design of a levee with the 'soft' issues such as the social system of the community. Effective integration of these can enable the creation of a stronger urban infrastructure as well as social vulnerability reduction.

It is also necessary to note that for proper planning with feasibility and effectiveness in mind, the organization of the disaster risk-reduction system should change depending on the characteristics of the risk of the region.

Planning for disaster risk-reduction

The most essential part of planning for disaster risk-reduction is, as mentioned before, to look at the overall picture (see diagram), and unify the whole and the part through finding the relation of each element to the whole environment.

In the ideal case of recovery, all of the three approaches explained previously maybe utilized integratively. An all-inclusive approach which concurrently considers environment, medicine, welfare, education, and industry through a step-by-step recovery program can ensure progress -slowly but surely. The first step is to satisfy the immediate needs of people through recreation of jobs and livelihood to boost the self-reliance status of people and boost their confidence. Next, enabling people to live together will lead to community rebuilding, which then follows on to the development of the region as a whole –restoring to full health. But the point worth noting here is that even the immediate tasks need to be approached with the long-term goal in mind. Hence, the recovery process must be designed with at least a 20 year timeframe.



An integrated concept of recovery

Implications for Tohoku

So how can these principles be applied to the case of Tohoku?

In affected areas where the major driving force is the primary or the secondary industry, it is most important to prioritize the aid for industry and jobs. This can be achieved through provision of necessary infrastructure for fishery, agriculture and farming, etc. The recovery can also be linked with consumer tax and its circulation which will lead to national development. And most of all the focus needs to be on the improvement of existing industries as well as support for new emerging industries local initiative.

The regeneration of the community and its continuation is dependent on human connections. Thus people must live together. If they are to move to higher ground, the community must move as a whole. The use of the ballot system for the selection of temporary housing and public housing must be avoided as it separates people. At the same time however, we must also consider the right of choice of people and allow them the freedom to leave the area if they wish to do so.

Preservation is also important. Considering how to properly utilize the abundance of nature that is available in Tohoku to mitigate future disaster risks is necessary. Equally important, is the preservation of history and culture unique to that region, along with the "disaster culture" which may assist future generations in planning for disaster mitigation.

Reform can be carried out through the process of rebuilding the governance of the region. The promotion of decentralization, autonomy and cooperation through recovery can work to raise the governing power of the region. The collaboration between the four sectors of community, government, business, and intermediary organization (NPO, etc.) can also help facilitate this.

(Edited by Y. Bhattacharya)

22nd and 23rd ICUS Open Lecture held at IIS

By T. Kato

The 22nd ICUS Open Lecture was held at IIS on April 16, gathering about 280 participants under the theme *"Consideration of Recovery from Great East Japan Earthquake and Tsunami Disaster from the Bird View"*. This unparalleled disaster in history revealed many problems from various perspectives.

Lectures and discussions focused more on problems from different viewpoints rather than pursuing details. Professor Yoshiteru Murosaki, Kwansei Gakuin Univ., talked about the philosophy of post-disaster recovery from various aspects. Professor Itsuki Nakabayashi, Meiji Univ., pointed out the balance between post-disaster recovery and preparedness/mitigation for the upcoming disasters such as the Nankai Trough earthquake, while also proposing the concept of "pre-disaster and post-disaster recovery action in Japan". Prof. Hiroshi Suzuki, Professor Emeritus at Fukushima Univ. explained about the complex problems that Fukushima faces, pointing out the crucial issues at present. Dr. Yukio Kawakami, who had served as Vice-Minister for National and Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, presented issues on national and regional planning. The following session, coordinated by Dr. Takaaki Kato from ICUS, IIS, featured timely discussions for the recovery, with its feedback to be given back later to the afflicted areas.

(left to right) Dr. Kawakami, Prof. Murosaki, Prof. Suzuki, Prof. Nakabayashi

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The 23rd ICUS Open Lecture was held at IIS on May 20 with about 200 participants. The theme was *"Reports of Current Situation from Afflicted Areas in Great East Japan Earthquake Disaster"*. It was also the first attempt for ICUS to host consecutive symposiums titled *"Recovery from the Disaster"* with Japan Society of Urban and Regional Planning (JSURP).

Social information sharing under the current post-disaster recovery stage is extremely important, as proved in the past experiences of the Kobe Earthquake disaster. However, it is not an easy task in times of such massive disaster.

Five speakers, dedicating themselves in the planning of the afflicted areas, discussed on the actual on-site situations, which showed a clear contrast with the 22nd Open Lecture. The presenters were Messrs. Toru Hiji (Otsuchi Town), Masunori Kusaka (Onagawa Town), Takao Sato (Ofunato City), Tadayoshi Inoue (Shinchi Town), and Tsuyoshi Takanabe (JSURP)*. Their heated reports were impressive and rich in content, and we wish there was more space on page to introduce the details.

At the fellowship banquet, panel discussion continued for seven hours! This marathon-like exchange served as a valuable opportunity for sharing information, and its outcome will contribute to the recovery of the afflicted areas. We all look forward to the next symposium!

**Mr. T. Hiji (Otsuchi Town): established NPO for recovery support immediately after disaster. Mr. M. Kusaka (Onagawa Town): urban planner from Urban Renaissance Co. (UR) supporting the local governments. Mr. T. Sato (Ofunato City): member of recovery planning committee authorized by the local government. Mr. T. Inoue (Shinchi Town): was sent by JSURP to support the local government. Mr. T. Takanabe (JSURP): experienced working in fishery villages.*

Speakers from disaster-stricken areas (left to right) : T. Sato, T. Hiji, T. Inoue, T. Takanabe and M. Kusaka

Research Committee 81 starts

By T. Kato

With the completion of RC 67, ICUS has launched a new industry-academia study, RC81, from FY2012, coordinated by Dr. Takaaki Kato.

Tokyo has been exposed to mega-flood risk, which will inevitably increase along with climate change, eventually leading to serious crisis. Damage estimation by the Cabinet Office, Government of Japan, predicts huge damage caused by mega-flood.

Yet, there is still time left for taking measures. The object of RC81 is to work out a kind of improved and secured urban technology package to prepare for the coming mega flood in mega-cities.

The first meeting of RC81

Urban technologies under discussion include infrastructure and urban planning policies. At present, private companies from different business sectors are the main members of the study group, with governmental organizations and NPOs participating as observers.

We hope the output will contribute in policy making and help to improve safety in cities.

Powerful tornado attacks Tsukuba Science City

By H. Sawada

A vicious tornado attacked Tsukuba Science City in Ibaragi Prefecture, located about 50 km north of Tokyo, on May 6, 2012. The tornado with F3 intensity rushed through the city for 17 km at the speed of 60 km/h, leaving severe damages to houses, trees, electric poles and cars. Damage in Tsukuba included one person fatally injured and 37 wounded. Houses destroyed totaled 622: 76 completely, 158 half and 388 partially. *(Fire and Disaster Management Agency)*

A wooden residence standing at the edge of a paddy field was completely turned upside-down from its foundation. Some other wooden houses collapsed completely with only wooden materials scattered around the remains of the foundations.

Damaged roofs were most commonly observed along the tornado path. A five-story apartment directly facing the tornado route received serious damage on its window glasses and frames, particularly on the upper floors.

Five-story apartment and its neighborhood

Destroyed houses

Toppled electric poles

The Society of Women Civil Engineers marks 30th anniversary

By R. Kuwano

The Society of Women Civil Engineers (SWCE) is a non-profit organization that empowers women civil engineers in Japan to continue serving in the community. Founded in 1983 by 30 members, SWCE has been the sole independent leading community supporting female engineers who widely cover various fields of civil engineering. The Society also supports nurturing of future women engineers in Japan. Currently, approximately 200 members belong to SWCE.

Dr. Reilko Kuwano, Associate Professor at ICUS, serves as SWCE's fifth president. The majority of the members, who are in their thirties or forties, have graduated from universities after the Equal Employment Opportunity Law was enforced in 1986. Members work either as freelance or as employees of construction companies, consulting firms, national or local governments and universities.

SWCE members in celebration

On June 22, a forum celebrating SWCE's 30th anniversary was held at the IIS Convention Center, the University of Tokyo. The theme of the forum was *"Future of Civil Engineering: Reconsideration of the Role of Civil Engineers"*. Over 220 participants of the forum, the majority of which being women, together discussed the significance of civil engineering missions.

Lectures at Public Works Research Institute

By M. Ohara

On March 15, the Institute of Industrial Science (IIS) exchanged MOU (Memorandum of Understanding) with the Public Works Research Institute (PWRI). In its commemoration, on March 27, Professor Kimiro Meguro and Dr. Miho Ohara gave special lectures at PWRI. The current Chief Executive of PWRI is Dr. Uomoto, the former Director of ICUS.

Prof. Meguro introduced the research activities at ICUS. He continued to talk about the *"Necessary Perspectives for Future Disaster Management in Japan"*, pointing out some disaster management problems revealed in the 2011 Great East Japan Earthquake disaster. The urgent need to make research on future disaster risks in Japan was emphasized.

Dr. Ohara talked about the *"Effective Use of Earthquake Early Warning (EEW)"*, introducing survey results on how citizens and manufacturing companies reacted to the EEW system after the 2011 disaster. She envisioned the regional tendency of the future EEW effects, and also described the necessary strategies to make better use of this warning system.

Under the MOU, special lectures, featuring recent research progress and study results of the two institutions, will be given on a regular basis this year, both at IIS and PWRI.

ICUS welcomes the collaboration with PWRI researchers, and looks forward to a productive outcome in future joint studies

Special lectures by Prof. Meguro and Dr. Ohara

Public works research institute (Tsukuba City) and Civil engineering research institute for cold region (CERI)

IIS Open House 2012

By S. Kondo

IIS Open House was held June 1 and 2, organized by the Institute of Industrial Science (IIS), the University of Tokyo. This event offers an opportunity for people of all ages, nationalities and professions to explore the IIS campus and learn about its research activities. Since 2001, ICUS has continued to participate, aiming to widely give out information about its activities and increase awareness of the importance of urban safety from many aspects.

About half of the 200 visitors to ICUS enjoyed the quiz competition.

Visitors enjoy ICUS quiz games at the IIS Open House 2012

Popular giveaway: handy wind-up LED flashlight

Winners were awarded with original giveaways, including a handy wind-up LED flashlight which can be used without battery in case of power failure.

Participants visited each lab, asking researchers questions and searching for answers. Through this fun activity, ICUS hopes that visitors become more aware of urban safety.

ICUS Activities April – June

- Dr. Reiko Kuwano visited San Diego, U.S.A., from Jun. 27- Jul. 1 to attend ASTM International-Symposia & workshops-Symposium on Dynamic Testing of Soil and Rock
- Dr. Kohei Nagai attended Society for Social Management Systems 2012 in Kaohsiung, Taiwan, from Mar. 28-Apr. 2. He also visited the University of Brescia, Italy, from Jun. 16-20 to attend Bond in Concrete 2012
- Dr. Akiyuki Kawasaki was at AIT in Bangkok, Thailand, from Apr. 4-May 29, and again Jun. 19-Jul. 14 for the operation of RNUS office and to give lectures. He also traveled to Singapore from May 3-5 and Madrid, Spain, from Jun. 17-20 for meetings on the Mekong River research project.
- Professor Haruo Sawada, Visiting Professor Yasuyoshi Ichihashi and Ms. Eiko Yoshimoto visited Ulaanbaatar, Mongolia, for coordination and preparation of USMCA 2012.

Awards and Honors

- Professor Mikio Koshihara received the Prize of AIJ 2012, awarded by the Architectural Institute of Japan, on May 30. The Prize was presented in recognition of his specific contributions in division preservation and sustainable utilization of Hizuchi Elementary School, which is a representative work of wood-frame modern architecture.
- Mr. Makoto Fujiu, Ph.D student in Meguro/Ohara Lab., received the Excellent Presentation Award at the Annual Conference of Institute of Social Safety Science on Jun. 15 in Wajima, Ishikawa, Japan. His research was entitled *"Study on Implementation of Building Damage Assessment of Local Governments after The 2011 off the Pacific coast of Tohoku Earthquake"*.

USMCA 2013: Oct 9-11 in Hanoi, Vietnam

The 12th International Symposium on New Technologies for Urban Safety of Mega Cities in Asia (USMCA 2013) will be held in Hanoi, Vietnam on **October 9-11, 2013**. Check out the ICUS website for latest information.

Editor's note...

More than a year has passed since the 2011 Great East Japan Earthquake. As mentioned by Professor Murosaki in the top article, recovery is steadily progressing in the Tohoku area. Many new activities, based on what we have learnt from the disaster, are now starting all over the country. One of the recent approaches worthy of note is the reviewing of damage estimations. Since the magnitude of the 2011 disaster was larger than what experts had estimated, the Cabinet Office or local governments are now taking into account the impact of earthquakes with lower probabilities, adding their seismic models in the assumptions. This spring, the Cabinet Office has published new maps of earthquake ground motion estimations, predicting a gigantic earthquake along the Nankai Trough that runs off the west coast of Japan. The City of Tokyo has also revised maps of earthquake ground motion estimations, incorporating latest scientific and technical updates. Other local governments also follow this new attempt.

Another movement is the revision of disaster prevention plans in each region, which is still ongoing as the reviewing process requires much time. But I have to say, I am a little skeptical about the lessons from the Tohoku earthquake being fully reflected. It is necessary to check the contents of these revisions, and give suggestions for more effective outcome. I expect many improved plans to be announced soon.

The next issue of ICUS Newsletter features latest damage estimations and regional disaster prevention plans by the Japanese local governments, along with discussions on future directions.

By M. Ohara

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The International Center for Urban Safety Engineering (ICUS) is a research center located at the Institute of Industrial Science, The University of Tokyo.

The purpose of ICUS is to identify, investigate, and resolve issues towards the realization of sustainable urban systems for the prosperity and safety of society considering challenging socio-economic problems.