# Special Issue
# An Interdisciplinary Dialogue on Post-quake Reconstruction

## Introduction:
## Toward an Interdisciplinary Collaboration on Post-Earthquake Reconstruction

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## ABOUT THE SPECIAL ISSUE

### About the Seminar

This second issue of Disaster, Infrastructure and Society features "An Interdisciplinary Dialogue on Post-quake Reconstruction." It is based on the seminar held at the Department of Civil Engineering, University of Tokyo (UTCE), on July 29th, 2011, which included two presentations by faculty members of UTCE who had been involved in the post-quake investigation and reconstruction of the tsunami affected regions, as well as a subsequent Q & A session with the members of the Study Group for Infrastructure and Society (SGIS), Hitotsubashi University.

This was a rather rare occasion where two

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**Seminar on Post-quake Reconstruction at University of Tokyo, July 29th, 2011**
**Speakers:**

*Tsuneaki FUKUI, Project Associate Professor, Center for Sustainable Urban Regeneration (cSUR), School of Engineering, University of Tokyo (UTCE)*

*Shin OSAKI, Assistant Professor, Department of Civil Engineering, University of Tokyo (UTCE)*

**Participants from Study Group on Infrastructure and Society (SGIS):**

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| *Yutaka IWADATE, Hitotsubashi University* | *Ikumi KAMIYAMA, Hitotsubashi University* |
| *Jiyoung KIM, Hitotsubashi University* | *Sunmee KIM, Hitotsubashi University* |
| *Takashi MACHIMURA, Hitotsubashi University* | *Sayaka MORI, Hitotsubashi University* |
| *Akihiko SATO, Hitotsubashi Universtiy, Fukushima University* | *Naofumi SUZUKI, Hitotsubashi University* |
| *Atsuo TERADA, Hitotsubashi University* | *Takefumi UEDA, JSPS, Keio University* |
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contrasting parties met to engage in a dialogue with a shared interest: a couple of civil engineers who were conscious of the relevance that "social" factors have to infrastructure development and management, and a group of sociologists who had just embarked on a research project to examine the relationship between physical infrastructure and society. The focal points of the dialogue, of course, were the devastating earthquake that terrorized the entire east coast of Japan and the process of post-earthquake recovery and reconstruction, which was just underway at the time of the seminar.

It is hoped that the seminar, as well as this issue, will enhance the process of reconciliation between civil engineering and sociology. On the one hand, it appears as if engineers are struggling to deal with the social side of their profession, while they are becoming increasingly aware of its importance when transferring their technical expertise to social reality. On the other hand, sociologists seem rather indifferent to the fact that any social process occurs under certain material circumstances, or, if not, at least may feel uncomfortable taking material reality into account when explaining social reality. This division is clearly visible in the process of the post-disaster reconstruction. While the engineers are almost always involved in the local advisory committees of the affected regions to give "technical advice," sociologists are often missing, despite the fact that this policy-making process is highly sociological.

### *Aims of the Special Issue*

This issue thus aims to serve three purposes. First and foremost, it seeks to voice unconditional support for those spirited civil engineers who dedicate themselves to building a secure nation. The irony is, however, that security is not only about being protected from life-threatening natural disasters but also about the comfort of being able to live a pleasant life every day. How the two can be balanced is dependent on value judgment. It is always contentious to find the right balance between preparing for the almost unpredictable, but destructive "someday," and improving or maintaining the welfare of the very foreseeable "tomorrow." This is not a choice for which engineers can take sole responsibility, but one that should ultimately rest on society's collective decision, conscious or unconscious. The general public may well be responsible for its blindness to the technicality involved in engineering decisions. Meanwhile, the engineers' aspiration to learn from the disaster and improve their expertise deserves to be honored and appreciated.

Second, the issue aims to caution against leaving the process of post-quake reconstruction in the hands of engineers only. However noble their spirits are, their expertise is limited in scope, and their technical decisions are often overwritten by political ones. After all, post-quake reconstruction is ultimately a process of rebuilding the social fabric of the affected regions. The coastal infrastructure must be rebuilt, and new housing and town development is also urgently needed. However, the areas' true loss was their people. Many lost their lives, and many others were forced to flee and evacuate their homelands. Engineers are certainly capable of laying out plans to reconstruct safe and functional living environments, but no one can guarantee whether the community interactions to emerge from them would be desirable ones.

Third, the issue will hopefully encourage sociologists to start playing more proactive roles in the reconstruction process. Sociologists are certainly underrepresented in the local post-earthquake reconstruction planning committees, where experts from engineering schools, such as civil engineers and city planners, often take central positions. Of

course, urban and regional development has been considered as predominantly a matter of engineering; however, engineers themselves have become increasingly aware of the need to take social factors into consideration, and yet are often not quite sure how to do so. It may often happen that interventions led by engineers appear to overlook the social side of development. This, however, is not because they cannot see it, but because they are not trained to deal with it. This is one area in which sociologists could be of great assistance to engineers. Arguably, sociologists can, and should, share the responsibility of making reconstruction planning truly serve the local communities.

### *The Dialogue*

The dialogue consists of two sections. The first part is the record of the two presentations, along with the subsequent discussions. Fukui and Osaki delivered two quite contrasting presentations in terms of their scopes and approaches, but they nonetheless underscored two common issues of considerable relevance to the sociological understanding of infrastructure development and management. First, they made it clear that "social" and "human" elements had been increasingly integral subjects of study within the academic circle of civil engineering. Second, they also indicated that the practice of civil engineers is embedded in the socio-political process of decision making, in which engineers should be understood to constitute only one of the concerned parties, having only a partial influence, rather than a decisive power based on their expertise.

This is then followed by three written responses by members of SGIS that constitute the second section, titled "A Reply from Sociologists." It is "a reply," not "replies," as these articles were assembled to represent the collective reaction of the sociologists who attended the seminar. The SGIS members held an internal discussion directly following the seminar in order to exchange views. There seemed to be a shared concern voiced in the discussion, that is, to question the roles of sociologists both academically and practically. On the one hand, it was clear that civil engineers had shifted their interests toward "people," and had thus come to share intellectual concerns with sociologists to a significant extent, blurring the boundaries between the disciplines. On the other hand, the sociologists witnessed the struggles of the engineers, who had once again seen nature trump the expert knowledge their predecessors had accumulated over thousands of years, and yet were already up on their feet and making practical contributions to the reconstruction of the affected areas. Sociologists as a profession, in contrast, seemed to lack the specific expertise to justify their intervention in the practical process of reconstruction. Either way, the seminar presented an opportunity for sociologists to reflect upon their own standpoints. The three essays hopefully convey this shared tone of self-reflection.

## THE "SOCIAL-NESS" OF CIVIL ENGINEERING

The first section starts with Fukui's close examination of the extent of the tsunami damage in Ishinomaki, which provides an analysis of the critical factors that divided those who lost their lives and those who survived. In doing so, he offers a self-critical reflection on the role of civil engineering in natural disaster prevention, indicating that civil engineers, as well as those who trusted them, might have become complacent, relying too much on modern engineering, while ignoring traditional local knowledge.

He highlights two factors in particular: the geographical characteristics of Ishinomaki and the patterns of evacuation behavior. In terms of the

geographical characteristics of Ishinomaki, Fukui argues that civil engineering should appreciate traditional local wisdom regarding where to live and where not to live; he bases this observation on the fact that the tsunami only struck the lower land of Ishinomaki, where there had been no settlement historically before modern civil engineering erected the seawalls to make it available for housing development. Social norms also played a part in guiding people's evacuation behavior. A lot of people apparently lost their lives in cars stuck in traffic jams, while few seemed to opt to abandon their cars and walk to higher ground. This example shows how hard it can be to deviate from norms, even in an emergency situation. Thus, Fukui recommends that these kinds of "intuitive" behavioral patterns need to be taken into consideration in designing evacuation routes. Hence, effective natural disaster prevention would not be possible without internalizing these sociological elements.

In the meantime, Fukui also raises another point for discussion in terms of the embeddedness of civil engineering in socio-political processes. Despite admitting the need for a shift to more humble, socially conscious approaches to disaster prevention, he doubts such proposals will become dominant in the post-quake reconstruction planning. It may be possible to propose improved solutions based on those findings, but whether this would be actually adopted is dependent on risk perceptions by concerned parties, including the national government. In this respect, the practice of engineers should be understood as part of the process of the "social construction of technology" (Pinch and Bijker 1984).

While Fukui's lecture is concerned with more conventional approaches of civil engineering toward disaster prevention, Osaki's project in Otsuchi offers an example that might not fit well with the conventional image of civil engineering. He discusses

a microscopic, "people-centered" project in which he and his students collaborated with local people affected by the tsunami to build self-made food stalls, so as to bring a sense of gathering and festivity to the community. His presentation certainly conveyed to the seminar participants the refreshing impression that civil engineering is changing. Ironically, however, his case also illustrates the difficulty of rendering the reconstruction process truly participatory and people-centered. Those who would be fit to constitute the core of a participatory process had also been deprived of their normal ways of living, with houses, jobs and basic infrastructure all lost, making it hard for them to stay in the community.

Osaki thus echoes two concerns: First, his participatory approach to designing community facilities is aimed toward positively stimulating the interactions of local people, and thus requires a sound understanding of community dynamics. Second, such a practice cannot be free from the larger socio-political process of reconstruction. This sort of participatory approach is only possible when the local people's daily lives are secure, which is not within the power of the engineers' designs. Sociologists would be of significant help in both areas.

## NEW ROLES OF SOCIOLOGISTS?

In response to the two lectures above, Sato opens the "reply" with a description of his observations of Iitate, one of the municipalities most severely affected by the radioactive emission from the nuclear power plants in Fukushima. He expresses his concerns over the process of Iitate's evacuation and resettlement-planning, pointing out two interrelated issues. First, he argues that the dominant influence of higher-order decisions was quite obvious, as conversations held in public meetings with local people seemed to have no influence whatsoever on the final plans. Second,

while those public meetings were supposedly held "for the local communities," the communities were inevitably underrepresented because of the fact that the large majority of them had already evacuated. Thus, if his observation stands, the participatory procedures in Iitate might be labeled as nothing more than tokenism. Along with the case reported by Osaki, this raises a question as to what could be done to ensure that the proposed reconstruction and resettlement plans truly reflect the interests of concerned parties — most importantly, the evacuated local people who are supposed to move back to the reconstructed towns and villages.

Terada then contemplates the profound question of whether we can rely on conventional civil engineering knowledge to ensure that we can continue living on the soil of Japan, which is considered to have entered an active period of seismic activity. Terada urges us to understand the decisive power of physical infrastructure to determine the way in which our urban civilization substantiates itself. In his eyes, despite the magnitude of the damage that once convinced him of the need for a "paradigm shift" to disaster prevention, it looks as though people have gradually reverted to former attitudes and the memories of the tragedy are fading. However, if, as Fukui suggests, conventional civil engineering was in part responsible for making the people vulnerable to natural disaster, then those conventions must be subject to scrutiny throughout the process of reconstruction. He sees this as the opportunity for sociologists to investigate the complex interactions between infrastructure and "everyday life," which should then provide the basis for the construction of a new vision for urban civilization in Japan.

The "reply" closes with Mori's expression of a newly discovered sympathy for civil engineers, whose dedication to disaster prevention and commitment to "seriously" consider "human"

elements impressed her. She states that her previous encounters with civil engineers had been so negative that she had come to perceive the profession to be rather inhuman, but the lectures by Fukui and Osaki apparently changed that perception. This was partly because they appeared very socially minded to her, as their analyses of the disaster extended beyond physical infrastructure and embraced human and institutional aspects, such as evacuation behavior, traditional local wisdom, and the social responsibility of civil engineering. Furthermore, what impressed her most was Fukui and Osaki's confession of the limited reach of engineering advice, which has less power in intervening in political decisions concerning reconstruction than some might believe. Then, she finds the common ground for both disciplines to fight together against such political power, particularly in protecting and making use of the traditional "local wisdom" embedded in each unique geographic environment.

## TOWARD INTERDISCIPLINARY RECONCILIATION

The devastation of the tsunami and the subsequent crisis in Fukushima must have been a great shock for the engineers who felt responsible for — and proud of — building a secure nation using their technological expertise. The coastal infrastructure was almost no use against a tsunami of such a gigantic scale, while nobody would have foreseen the horrendously vulnerable nature of the nuclear power plants, which were supposed to be protected by multiple layers of safeguard mechanisms.

Engineers might also feel responsible for leaving the people so oblivious to the possibility of technological failure. A lot of people lost their lives, homes, or families, whereas they were "not supposed to." It

is so easy to point fingers at the engineers, blaming them for their incompetence. Indeed, many of them must feel devastated that they let down not only the people but also themselves. They could have done better. But, we all could have.

In summary, this final section attempts to tease out some of the recurrent issues throughout the dialogue and consider the possible means of collaboration between civil engineers and sociologists in relation to each issue.

### Social Awareness of Risks Involved in Engineering Decisions

First, it is necessary to raise awareness concerning the risks involved in any engineering decisions. Any technical solution proposed by an engineer is based on a set of assumptions that are supposed to be "safe enough" in a "realistic" sense. Hence, when an "unreal" reality materializes, and thus the assumptions prove wrong, the technology can sometimes fail. Engineers are all aware of that. The problem is, however, that our modern world, as Giddens points out, is founded upon "expert systems" that are so highly specialized that we can only trust experts rather than trying to acquire specialized knowledge ourselves. In this situation, most people are unaware of the assumptions on which the experts' decisions are dependent (Giddens 1990). When experts say that something is safe, we can only assume that it must be safe. In his report on Ishinomaki, Fukui suggested that engineers might have deluded even themselves in believing that when they say that the situation is safe, it truly is:

> In modern times, civil engineers became increasingly overconfident that man could be protected from the natural elements—a belief shared by citizens. […] The lesson we learned is that considering the tremendous force of

natural disasters, there need to be areas that are not be for human use. Not even modern civil engineering can totally overcome nature.

Thus, one source of the shock was the loss of their belief in themselves and their ability to make the nation safer. Another professor in the field of civil engineering said in a personal conversation a few days after the event, "Our responsibility, as engineers, is not to provide a 100% safe solution, but to be prepared for the occasion when the reality exceeds our assumptions, because anything is possible in this world." Thus, civil engineers responded very quickly to the disaster. Fukui's group was among many of those who visited the tsunami-stricken areas immediately after the event, pondering what they could have done, and what they could do now and in the future.

Notwithstanding the ethical attitudes widely shared by civil engineers, it is still a problem that the large majority of people are ignorant of the fragility of engineering assumptions. Therefore, this may be one of the areas to which sociologists could contribute, in part by promoting the knowledge accumulated through the work of the sociology of technology and science.

### Post-quake Reconstruction as Process of Social Construction

Second, the dialogue underscores the fact that the practice of civil engineers is only part of the process of social construction (Pinch and Bijker 1984). Engineers' decisions and advice are not directly reflected in the post-quake reconstruction plans. Rather, they result from their interactions with other interest parties, such as politicians, administrative officials, business communities, and local residents, among others.

Indeed, the engineers were shocked not only because

the scale of the earthquake and the tsunami simply exceeded the assumptions upon which the designs of the coastal infrastructure and the nuclear power plants were based, but also because some of the adversities could have been avoided if their technical advice had been accepted and the decision makers had made "safer" decisions. They had proposed solutions well before the earthquake that would have prevented some of the damages, such as the explosion of the nuclear power plants, if only they had been adopted.

For example, although it is difficult to reconstruct the truth now, some say the coastal levees protecting the nuclear plants should have been higher, since there had been a projection predicting a tsunami as high as nine meters, while the actual height of the levees are around five meters. Such stories are ubiquitous. While it may be true that there had been a number of misjudgments made by different decision makers in that their decisions turned out to be not safe enough to prevent the damages, those decisions were not purely technical but always economic and political as well. Engineers could only present possible scenarios and corresponding solutions, but it is the decision makers who have to decide whether to accept them.

This is nothing new to sociologists: a few decades have passed since Pinch and Bijker used the term "social construction of technology." But, sociologists should do something more than simply emphasize this. I would argue that they should also actively engage in the process of social construction. More often than not, sociologists' stance in intervening in infrastructure development might have been rather confrontational to engineering. When civil and urban engineers take the side of planners who try to drive forward their development agendas, sociologists sometimes take the side of the activists opposing them. There is a tradition of sociologists intervening in reality so as to empower the "powerless." In

this respect, however, engineers, who are usually supposed to be relatively powerful because of their superiority in expert knowledge, may also be regarded as powerless to a considerable degree.

### *Beyond the Epistemological Divide*

Third, the dialogue suggests that what may be called the "epistemological divide" between civil engineering and sociology needs to be overcome.

Of course, the need for understanding this social process has been felt by civil engineers from within the discipline itself. It must be noted that the two speakers are no exception among contemporary civil engineers. The last two decades have seen "human" and "social" subjects become increasingly popular research themes within the civil engineering circle. UTCE, for example, has six research groups for undergraduate students to choose from, and four are more or less concerned with social or human subjects. Thus, it should be no surprise that civil engineering and sociology have a lot in common as far as research interests are concerned.

Naturally, though, civil engineers must often negotiate with the fact that social entities are not amenable to an engineering perspective. Simply put, social elements may still remain "uncontrollable." Their reaction to this realization tends to be either to leave the matters only to subjective judgment, or to confine themselves to purely "objective" observations.

These two polarized stances most starkly manifest themselves in the ways in which engineers intervene in participatory decision-making processes, such as workshops or public meetings for town planning. Some would unashamedly impose their subjective views upon their counterparts and try to persuade them, and others may provide assistance to participants and facilitate their "self-decision," without questioning such things as the

representativeness of participants or the ethical consequences of the decisions made.

Social science has long coped with this dichotomy between subjectivity and objectivity and has attempted to find the middle ground somewhere in between. Of course, there is no single agreeable answer to this, and there is a broad spectrum of philosophical standpoint any social scientist could take. One thing for sure, however, is that social science needs to continuously engage with this open-ended process of reflexivity. And, civil engineering, as long as it tries to deal with the social reality, is no exception. Therefore, sociologists' active engagement in the dialogue with civil engineers is necessary in this respect.

### Understanding the Uniqueness of Locality

Finally, sociologists could contribute more directly to generating knowledge for the construction of a "new paradigm" for disaster prevention. The dialogue has made it clear that incorporating local knowledge is the key to both disaster prevention and post-disaster reconstruction. Engineering may tend to pursue universally applicable technology, whereas any local knowledge is unique to its context.

Thus, the sociologists' contribution to this would be twofold. One would be to carry out studies on the local wisdom found in different localities and to inform the engineers about them. The other would be to develop an institutional framework with which the transfer of local knowledge into engineering designs could be effectively facilitated. The latter is particularly relevant, as "community involvement" mechanisms often tend to be characterized by confrontation, disagreement, and power games, and thus end up in a deadlock. In contrast, what is truly needed is constructive collaboration to overcome the differences and proceed.

Despite the obvious complementarity of the two

sets of experts, generally speaking, their respective professional practices rarely seem to interweave. They may sit together on various kinds of committees to provide different viewpoints, but they do not necessarily try to overcome their differences themselves and work together. Their encounters are even sometimes confrontational, as noted above. They engage in debate, but not in dialogue. This dialogue, therefore, will hopefully work as a building block for the much needed constructive collaboration between the two.

### References

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