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Author(s)	MACHIMURA, Takashi
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# Special Issue

# The Logic of Cascading: Infrastructural Perspectives on a Post-disaster Situation

## Introduction

### “Normal” Disaster in the 21th Century?: Understanding Cascading Effects of the East Japan Great Earthquake

*Takashi MACHIMURA*

#### TRIPLE DISASTERS AND MORE

Several days after the 3.11 earthquake, the banking system of Mizuho, one of Japan’s major financial groups, suddenly broke down at a national scale; moreover, serious trouble continued for almost a week. It happened when a large number of transactions for disaster-relief donations, supported by one of the national TV networks, flooded into several branches of Mizuho in Tokyo. The total amount of transaction surpassed the capacity of the system. Several months later, it was also reported that the system’s dysfunction was accelerated by a deficit in the system’s original design.

As can be inferred from this case, the effects of the disaster were broad, unexpected, cascading, and cumulative. The interconnectedness among different systems, particularly infrastructure-wise, a facet that is otherwise not so apparent, can produce an unforeseen disastrous effect. In the aforementioned instance, the damaged area was very wide, including both the core and periphery of the nation. Under such conditions, the form and degree of suffering is often

differentiated by place, class, gender, nationality, and other characteristics.

This is one of the reasons why our research group compiled a variety of “disaster-related” events from media content like websites in the form of a day-to-day chronicle. It covered not only tsunamis and nuclear accidents but also related causes such as infrastructure, politics, military affairs, economies, daily lives, cultures, media, and civil societies. By the end of 2011, more than 11,000 events that occurred for about two months after the 3.11 disaster were listed. The study is now open to public and is available on the Hitotsubashi University Repository website.<sup>1</sup> One of the major findings of the chronicle was a simple yet essential fact that suffering systems varied, were spread out, and interconnected.

#### FOR UNDERSTANDING THE LOGIC OF CASCADING

On January 24, 2012, the first Study Group of Infrastructure and Society (SGIS) workshop, Understanding 2011 Disaster in Japan: Crisis,

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Takashi MACHIMURA, Professor, Graduate School of Social Sciences, Hitotsubashi University

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*Takashi MACHIMURA*

Resilience and Emerging Regime, was held at Hitotsubashi University, Tokyo. The meeting was focused on the reconsideration of structural impacts of the East Japan Great Earthquake from a critical (sociological) point of view. Presented papers were divided into two groups: one was on different faces of the disaster and the other was on various impacts on urban infrastructures.

In the first part of the workshop, Stephen Graham, a professor of Newcastle University, gave a plenary talk via Internet, titled “Disrupted Cities: Infrastructure Disruptions and the Logic of Cities.” After a critical analysis on infrastructural disruptions and the “distinctiveness” of cities, Graham, at last, raised several possible questions for the future research on the 2011 Disaster in Japan.

- What did the disaster expose about the infrastructural, political, sociotechnical, and social norms of Japanese society during times when infrastructure systems operate normally?
- How have the usually hidden politics of infrastructure been exposed?
- Can new concepts of cyborgorganized urbanism help to understand the disaster more completely?
- How did disruptions cascade in time and space in nonlinear and surprising ways?
- How can research on these help to build resilience into infrastructure design, urban planning, and disaster preparedness?<sup>2</sup>

Disruptions caused by the triple disasters, as Graham pointed out, cascaded in time and space. The way of cascading was not only linear, direct, and expected but also nonlinear, indirect, and unexpected. Probably it was easy to emphasize how unexpected and exceptional this disaster was. For instance, a 9-magnitude earthquake, 20-meter and above high tsunami waves, and severe accidents of nuclear power

plants are all unusual and beyond expectation.

However, it must be erroneous to overemphasize their unexpectedness. As shown earlier, a major banking system that was not directly damaged by the disaster itself was disrupted nationally by the rush of relief donations. Yet, actually, it was accelerated also by a deficit in the system’s original design. The disruption might be unexpected, but, it should be seen as structural. We can add many other episodes to this, such as the fact that automobile industries all over the world were influenced by the disaster in the way of disruptions in supply chain of car parts manufactured in the tsunami-hit factories in Japan. This was also unexpected, but it never happened without the increasingly globalization of manufacturing processes.

The focus of the chronicle is that such cascading and often seemingly unexpected effects present, actually, a dominant story of contemporary structural disaster. In this point, I believe the experiences in Japan include a lot of hints and lessons for the advancement of understanding about such changing social realities not only from a disaster-oriented perspective but also from broader perspectives of social sciences and humanities. Graham’s questions, based on his related works,<sup>3</sup> give us the basic frameworks for future study. In addition, various recent studies on other major disasters such as Hurricane Katrina also present potential and feasible models for such a critical research.<sup>4</sup>

### “NORMAL” DISASTER IN THE 21ST CENTURY?

Our attempt to study is still going on, and the following articles in this issue are tentative results of our continuing projects. It is too early to say something as a conclusion. However, in our own research, in fact, it became clear that a series of

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events that occurred after 3.11 presented critical theoretical issues that are becoming more serious and structural in current globalizing, neo-liberalized, and “assemblage” society.

Here I would like to address a hypothetical question. Is the disaster we experienced a “normal” disaster in the 21st century? The term “normal” comes from Charles Perrow’s notable book, *Normal Accidents: Living with High-Risk Technologies* (1984). In his analysis of the Three Mile Island accident of 1979, Perrow indicates “(M)ost high-risk systems have some special characteristics, . . . , that make accidents in them inevitable, even ‘normal’.”<sup>5</sup> As a scholar of complex organizations, Perrow emphasizes that the current systems of infrastructure and productions have unique characteristics such as interactive complexity and tight coupling within organizations. If such system characteristics inevitably will produce an accident, “I (Perrow) believe we are justified in calling it a normal accident, or a system accident.”<sup>6</sup>

While using the term “normal,” Perrow originally focuses on the cause of accidents, particularly those arising from within complex organizations. In contrast, my argument here is that we should extend the focus of analysis from an organizational level to a broader system level. As described earlier, one of the main characteristics of the 3.11 disaster was the complex interconnectedness of suffering systems. It implies that an accidental event in one system can be the cause of unexpected trouble in another system. The key point is not just a system but a system of systems or “assemblage.” People cannot understand the reality of the contemporary disaster without paying attention to such interactive complexity and tight coupling across different systems.<sup>7</sup>

## STILL “THE SOCIAL” MATTERS: URBAN ASSEMBLAGES AND AGENTS

Urban infrastructure is not just a collection of technical “things” but “complex assemblages that bring all manner of human, nonhuman, and natural agents into a multitude of continuous liaisons across geographic space.”<sup>8</sup> Infrastructure is a fundamentally relational concept.<sup>9</sup> Thus, a sudden experience of its disruption can force people to change or at least doubt their attitude toward material settings that are usually “bracketed.”

For instance, just after the earthquake, “scheduled rotating blackout” was planned by Tokyo’s electric power company (TEPCO) and was put into practice for almost two weeks to reduce the risk of unexpected “total” blackout in the Tokyo metropolitan region. Under the repeated blackout, people knew the city was a part of “assemblages” that had been invisible in the “normal.” Yet, even in such a “crisis” situation, actually, individual agents responded to it differently. This made clear the hidden disparity in resilience, usually embedded in the context of everyday life.

According to our shopkeeper survey in a suburban city in Tokyo, branch shops of national chain stores were often totally closed during the time of scheduled blackout because of the difficulty in sustaining a level of nationally “standardized” services, which depended heavily upon complex systems of infrastructures. On the other hand, self-employed local shops often tried to continue their operation. One of the key factors for continuous operation was the ability to concentrate their functions to the limited core, even accompanied with decreased satisfaction of both shopkeepers and consumers.

Resilience against system disruption depends upon the flexibility of daily operation and individualized “culture of repairs.”<sup>10</sup> This fact reminds us of

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the importance of continuous work necessary to bring about infrastructural circulation even when assemblages are working normally. The position of agents is still crucial even in an “assemblage.” However, the consequences of “culture of repairs” in any process can be imbalanced because the working of such “culture” actually depends upon social, economic, and cultural capital of each agent. The culture itself is shared unevenly by the population. The process of this multiple disaster was mediated by various forms of material things. At the same time, its effects were still channelized through the political arena and other institutional settings, and finally, an actual form of their manifestations was always socially selected and culturally managed by both collective and individual actors.

“The social” still matters. When studying contemporary structural disaster, we have to put “the material” into social settings, and, simultaneously, put “the social” into material worlds methodically and theoretically. The interconnectedness of suffering systems, such as energy, transportation and communication, manufacturing, finance, media, and culture, made this disaster more complicated, serious, and difficult to be handled not only in its damaging process but also in its recovery process. Furthermore, under continuously globalizing situations, accidental events can be easily interconnected across national boundaries. The chained effects can go beyond the traditional boundaries among markets, governments, and civil societies because of deregulation and privatization in the current neo-liberalized society.

Almost two years have passed since the severe days of crisis. Yet a lot of “new” facts on the disaster are being “discovered,” not only by those who directly experienced it but also by scholars, professionals, journalists, and critics. The disaster is still going on—a large number of evacuees and refugees, continuing anxiety about nuclear safety, and cumulative impacts

from stagnating recovery process itself. Therefore, no one knows how and when the impact of the disaster will end. We should not forget that a disaster is always surprising and can be beyond our imagination. However, now we recognize that it is extremely important to accumulate knowledge on disasters and develop our lively imagination to figure out what may happen next. The following articles in this issue and those in the next issue will set up a forward base for this.

### Notes

- 1 Takefumi Ueda, et al., “The Great East Japan Earthquake Chronicle 2011.3.11-2011.5.11,” *Disaster, Infrastructure And Society: Learning from the 2011 Earthquake in Japan*, No.1, pp.13-269, (<http://hermes-ir.lib.hit-u.ac.jp/rs/handle/10086/22109>).
- 2 Stephen Graham, “Disrupted Cities: Infrastructure Disruptions and the Logic of Cities,” presented at SGIS Workshop, Understanding 2011 Disaster in Japan: Crisis, Resilience and Emerging Regime, January 24, 2012, at Hitotsubashi University.
- 3 Stephen Graham, 2010, *Cities under Siege: The New Military Urbanism*, London: Verso, Stephen Graham, ed., 2010, *Disrupted Cities: When Infrastructure Fails*, New York: Routledge.
- 4 For instance, see Cedric Johnson, ed., 2011, *The Neoliberal Deluge: Hurricane Katrina, and the Remaking of New Orleans*, Minneapolis: University of Minnesota Press, Phil Steinberg and Rob Shields, eds., 2008, *What Is a City?: Rethinking the Urban After Hurricane Katrina*, Athens, Ga.: University of Georgia Press, Ronald J. Angel, Holly Bell, Julie Beausoleil, Laura Lein, 2012, *Community Lost: The State, Civil Society, and Displaced Survivors of Hurricane Katrina*, Cambridge: Cambridge University Press.
- 5 Charles Perrow, 1984, *Normal Accidents: Living with High-Risk Technologies*, New York: Basic Books, p.4.
- 6 Ibid, p.5.
- 7 As related works published in Japan, see Miwao Matsumoto, 2012, *Kozosai: Kagaku Gijutu ni Hisomu Kiki (Structural Disaster: Crisis in the Society of Science and Thechnology)*, Tokyo: Iwanami Shoten.
- 8 Stephen Graham, 2010, “When Infrastructure Fails,” Stephen Graham, ed., 2010, *Disrupted Cities: When Infrastructure Fails*, New York: Routledge, p.11.

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9 Susan L. Star, 1999, “The Ethnography of Infrastructure,” *American Behavioral Scientist*, Vol. 43, No. 3, p.380.

10 See Graham’s paper in this issue and *ibid.* p.19. disasters and develop our lively imagination to figure out what may happen next. The following articles in this issue and those in the next issue will set up a forward base for this.