

A student waiting at 4:30 a.m. for a bus in a suburb of Bangkok to go to school located in the city center<sup>1)</sup>

## Final thoughts

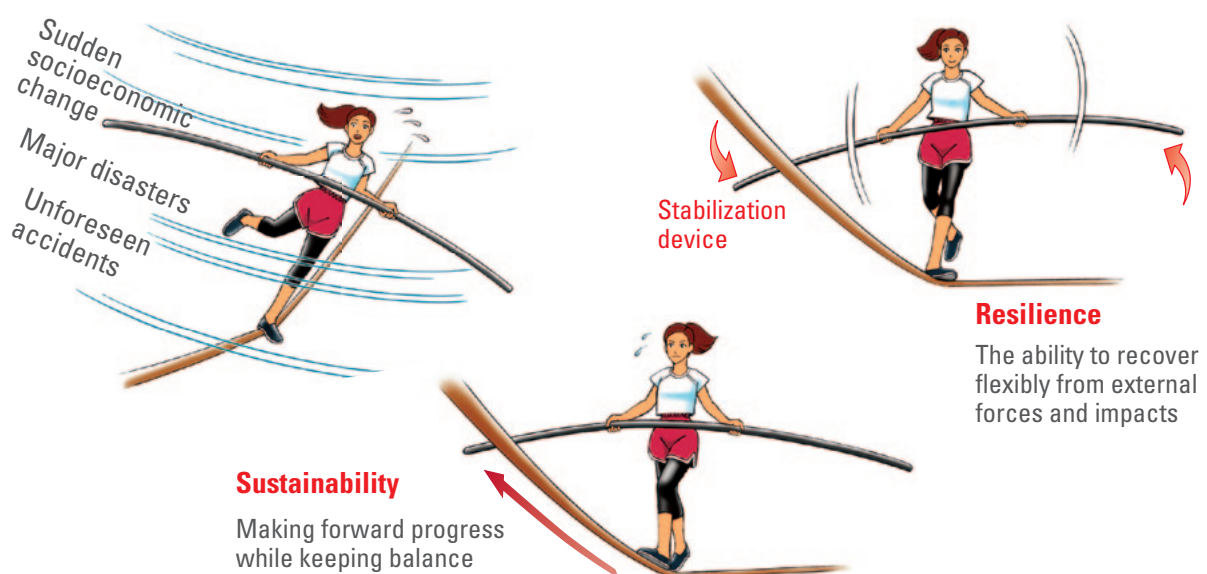
# Resilient mobility society

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Before concluding the Theory section, this chapter will explain “traffic resilience” as a concept essential for transportation during ordinary times as well as during emergencies. Here, three important levels in transportation will be kept in mind: technology, systems, and society.

Besides denoting the ability to recover or stabilize, “resilience” also means flexibility. To define resilience in terms of moving people or objects, a resilient object would be one on a tightrope that, whenever it is shaken or pushed to the side, will always come back to its original standing position. In tightrope walking, balance can be restored against a certain amount of swaying if there is something like a balancing pole to act as a stabilizer. If the tightrope walker stops, however, the balance maintained while walking may be lost and the rope may start swaying. Sustainability, which is used in contrast to resilience, is conceptualized as the ability to use one’s last step as support in taking one’s next step forward, without stopping. The basis for sustainability, the ability to take that step forward, could not be formed without resilience—the stability of ground to stand on Fig. 1. In this sense, instead of defining resilience as a



**Figure 1. Resilience and sustainability**

special quality for times of disaster or emergency, resilience should be defined as a prerequisite for accumulating steps forward each day, and realizing a safe and sustainable mobility society.

Below, I introduce the connotations of resilience learned through my own experiences in a developing country in Asia. Factors involved in realizing a resilient mobility society are also discussed.

## Non-resilient traffic situations

I visited Bangkok and stayed with a friend of mine in the 1990s. During my visit, there was an incident where the school bus my friend's children rode had not arrived by 8:00 p.m., even though it usually arrived by 5:00 p.m. We were all worried that the bus had been involved in some sort of accident, but it turned out it was just stuck in traffic.

In those days, I was involved in the Advisory Committee of JICA for the Study on Improvement Plan for Railway Transport in and around the Bangkok Metropolis in consideration of Urban Development in the Kingdom of Thailand (1992–96), which was organized by the Japan International Cooperation Agency in order to alleviate the huge traffic jams in the city of Bangkok by using the railway system as a cornerstone. Having been appointed as the chair of the project, I was astonished that the city's traffic congestion was extraordinary. A survey conducted at the time revealed that the percentage of people who spent more than 8 h a day commuting in the Bangkok Metropolitan Area had reached 10%. Although I did not know the term “resilience” at that time, when I learned the word, I came to realize that the traffic congestion in Bangkok had been totally *non-resilient*.

A group of Japanese and British researchers attempted to remedy the congestion in Bangkok using traffic signals, but soon ran out of options because of the reality of the situation, where the tail end of vehicle queues at one traffic signal would enter through the intersection at the next traffic signal. Once vehicles entered an intersection for a right or left turn, they could no longer move and stayed at an oblique angle to other traffic lanes. This is gridlock, meaning the paralysis of the grid-like system of roads. A traffic jam with no moving vehicles spreads through the entire network of intersecting streets. As soon as a traffic jam started at one intersection, vehicles at the next intersection also came to a stop, and this spatial propagation affected other intersections one by one. From the perspective of the system, a microsociological phenomenon at individual intersections transforms into the macrosociological phenomenon of hypercongestion. The phenomenon then propagates throughout the entire road network and paralyzes it. This is similar to dysfunction in one area of the body spreading throughout the body and incapacitating the entire regulatory network.

In terms of time, hypercongestion is characterized by an increase in travel time and in the size of its fluctuations because, for example, a certain distance that required 2 h to travel yesterday may require 4 h today. When considering traffic resilience, it can be said that traffic is resilient if travel time fluctuations converge within a certain range. However, when fluctuations extend outside of this range and cause the traffic to become divergent and lose the ability to recover, this can be regarded as non-resilient traffic. Non-resilient traffic becomes extremely unstable, making prediction of travel times impossible, and

affects not only the transportation system, but also urban activities and the economy. For example, it may become impractical to make multiple business appointments for the day, and only one meeting may be scheduled for the morning or afternoon. I witnessed how the resilience of society was lost because of the adverse effects of traffic congestion.

## **Establishment of a multidisciplinary organization to address problems**

Around 1992, the State Railway of Thailand (SRT) was in a very weak position. In developing countries including Thailand, the railway system was considered to be a dirty transportation system used by only people at the bottom of the social strata. Because of daily delays, railway systems were not trusted and most government officials involved in decision-making used chauffeur-driven cars and had no interest in railways. Consequently, even when the significance of railway systems was explained at the National Railway, which should be the center of the railway system, the idea could not reach the decision-making officials.

The project we undertook aimed to revive the railway system within 200 km of Bangkok. However, we could not access or use the land under the railways in the central part of the SRT network, which included 15 km of the Northern Line and 30 km of the Eastern Line, because the land use rights were held by the Hopewell real estate company, based in Hong Kong. Because of this, we decided to embark on the following two things. First, to move the project forward, we established a multidisciplinary organization. Instead of attempting to proceed through only the SRT, we made the steering committee an interdisciplinary body spanning various government ministries, and asked Administrative Vice Minister Sansern of the National Economic and Social Development Board of Thailand (NESDB) to serve as the committee chair and Vice President of the National Railway to serve as the vice committee chair. We also requested the participation of officials involved in land utilization or transportation, such as those in the Housing Agency and the Ministry of Transportation.

The NESDB was an organization similar to the then Economic Planning Agency of Japan, yet had authority equivalent to that of the Department of the Interior. We comprehensively explained to the committee members how significant the railway system was. At that time, Bangkok already had a population of 6 million and the entire Bangkok Metropolitan Area had a population of 11 million. Bangkok was a megacity that needed to use the railway system to resolve the basic issue of transportation demand. We tried to make the committee members understand that if only roads, but no railways, were used to address the problem, the transportation demand would not be controlled unless the majority of the metropolitan area was transformed into roads. Amid these efforts, the Bangkok Post reported the concern of King Bhumibol regarding the massive traffic congestion in Bangkok, and this generated a much needed tailwind and changed the minds of the committee members.

In a series of related events, the Office of Commission for the Management of Land Transport (OCMLT) was held in 1993. Although traffic-related issues were originally under the jurisdiction of the Ministry of Transportation, they were placed under the jurisdiction of the Prime Minister to make all

government ministries responsible for addressing traffic-related issues. Under the new system, an interdisciplinary organization was developed, for which Professor Kumropluk, of Urban Planning at Kasetsart University, became the appointed deputy director. In this way, the organization was entrusted to professionals in urban planning who had a holistic view of the entire city, which became advantageous later on.

Another key to solving the traffic congestion was taking the time to continuously and persistently make all the committee members understand the usefulness of rail transit systems through the whole period of the JICA's study. In 1999, 3 years after the final report meeting for the project in January 1996, the first Skytrain line commenced operation. The development of intercity train tracks had been a long-sought plan of Governor Chamlong and Deputy Governor Winai since the 1990s. We made some materials to illustrate to the passengers of the elevated line that they would be able to look down at the traffic congestion below before returning home between 6–7 p.m. and enjoying dinner with their families. At the time, such a lifestyle was absolutely impossible, as it took 4 h to go home after work. However, we continued to show such a lifestyle as the future lifestyle of Bangkok and continued to draw attention. Finally, the road to realization was opened when elevation of the Skytrain rails was completed.

## **Innovative attempts to create novel travel styles, habits, and culture**

To increase the acceptance of new transportation technologies and systems, it is important to persuade people exhaustively as well as allow them to actually experience the new transportation technology so they may go on to talk about it. One of my friends, an assistant to the president of Chulalongkorn University, gave great praise to the reduction in her commute time from 1–2 h one way by car to 15 min by Skytrain.

One of the factors that contributed to the creation of the novel style of travel on Skytrain was the flat fare of 30 baht. There was a debate over whether the fare should be 20 or 30 baht. Some raised a concern that the fare of 30 baht would deter low-income people from taking Skytrains, but ultimately the fare was set at this level. As a result, white-collar workers became the main users, showing that we were able to attract middle-income people, who would have otherwise bought a car, to commute via the clean and comfortable railway system. Furthermore, the social status of the users helped to raise the position of railways in the society. The development of the Skytrain system was followed by the development of subways and the Airport Rail Link (maximum velocity, 160 km/h) to Suvarnabhumi Airport, resulting in a total of 84 km of new urban railways in the 13-year period from 1999 to 2012.

Around the same time as the shift in transportation mode brought about by these measures, the construction of urban highways began parallel to the railways. Although the average speed on the streets in Bangkok was approximately 20 km/h in the mid-1980s, it was reduced to 6 km/h, the same as walking speed, in 1992. Today, the speed is back to near 16–17 km/h. Last year while speaking with the vice president of the public enterprise for the Thai underground subway system, I was pleasantly surprised to hear “two whole hours”, as in, “it took *two whole hours* to get home from Suvarnabhumi Airport!” A

travel time that had once been an inconceivably short had come to be seen as unacceptably long.

Three factors played a role in improving the speed on the streets of Bangkok. The first factor was, needless to say, the urban railway systems, including Skytrain, along with the measures such as the fare system for keeping the infrastructure clean. The second factor was the simultaneous development of the urban highway system. The third was the construction of the outer beltway. The urban highway and railway systems absorbed traffic from the roads, and at the same time, the beltway absorbed the through traffic.

In hindsight, traffic resilience was improved by the improvement of systems. At that time, foreign capital was flowing out of Bangkok into Kuala Lumpur, Jakarta, and Singapore due to the fear of non-productivity caused by the hypercongestion. However, due to the improvement of the congestion, foreign capital has started to return to Bangkok. In addition, by enhancing the resilience of the transportation system, the economy recovered as well. The return of industry has increased the size of the overall economic pie, which has gradually increased the distribution of income and thus mean income.

The relationship between transportation systems and society should not be oversimplified. Although questions remain as to how thoroughly the governments of Thailand and the Bangkok Metropolitan Area considered the effects of this plan, the goal was realized only because of the development of the interdisciplinary organization that enabled more fruitful discussions.

Following the development of the Skytrain system in 1999, the subway system and the Airport Rail Link were established one after another. It was fortunate that Professor Kumropluk, who was integral to the project's success, became the deputy director of the interdisciplinary organization, and it was also greatly helpful that the other personnel we supported were able to become the organization's think-tank and change the minds of others from the inside.

## **Resilience and sustainability of the mobility society**

Resilience at each time point determines the sustainability of the steps to be made over time. Compared with resilience, which is a stage in short-time flows, sustainability is close to the concept of a long-term stock and is defined as sustained dynamic stability over a long cycle of 20–30 years. This is not to say that one of them is more important than the other; both are equally essential.

For example, automobile companies are the major players in transportation technology and their employees know automobiles very well, but often the companies do not comprehend the overall traffic situation. This is fatal. It is important to have the proper attitude when considering which frame should be used to understand traffic-related issues and what common ground is used for this understanding. In this chapter, mobility society has been examined on three levels: transportation technology, systems, and society. However, the key point is the kind of common mindset that the people who develop techniques and methods use to view the mobility society. It is not simply about social responsibility; breadth is needed to cross-sectionally share knowledge and awareness. I believe that the founder of the IATSS, Mr. Soichiro Honda, had keen intuition about transportation-related issues, including how to maintain

resilience and sustainability for the entire mobility society. The IATSS reflects the spirit of its founder and is of great significance as it continues on as an organization entrusted with these great responsibilities.

#### Reference

- 1) *Bangkok Post*, September 4, 1993.

#### Practical application projects for reference

Realization of earthquake disaster crisis management and a society with safe and secure transportation: 208–211