

Natural Disasters: Alleviation of Impact – a Historical Viewpoint



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As we enter the centenary year of the Great Kanto Earthquake (1923) and the 12th year since the Great East Japan Earthquake (2011), it is time for reflection. This article offers a brief historical viewpoint on how the impact of natural disasters has been alleviated in Japan.

Disaster Mitigation Training

A friend of mine who works for the Tokyo Metropolitan Fire Department asked me last year if I could – as a foreign resident of Tokyo – speak and record a short slogan for the “Tokyo International Fire and Disaster Prevention Exhibition 2023”. I visited the Disaster Education Center in the Toshima municipal ward – one of several such centers in the city. It houses plenty of material meant for educating the public on disaster awareness and mitigation. It has “*experience*” sections where visitors can get a glimpse of what earthquakes of different intensity feel like, learning how to evacuate in the event of smoke and fire, and learning basic first aid techniques as well as the use of fire extinguishers. Even night tours are available for understanding the foregoing activities in dim or no-light situations.

Before the recording, I was shown an excellent video on the impact of tremors and how damage from them can be minimized in this earthquake-prone land. The center works closely with schools to educate children – a valuable lesson at an early age – and with many public and private social organizations. The level of engagement with the public was impressive and the commitment to safety and information dissemination commendable. The fire department keeps these centers up to date through close cooperation with companies, research institutes and municipal organizations for the latest in disaster mitigation and management.

I was requested to deliver in English (or in an Indian language) four short slogans typifying the objective of the event. The slogans were: “*A Safe Society Together*”, “*Safety and Security!*”, “*Towards a Safer City*”, and “*Together*”. The last of these emphasizes in the shortest possible terms the point that effective disaster management is a cooperative and coordinated effort. The event is to be held in June 2023 at the Tokyo Big Site Exhibition grounds. It will be an important occasion for providing information on disaster risks and mitigation measures and for promoting technologies and industries that manufacture disaster mitigation products for consumer use as well as for bulk usage (<https://www.fire-safety-tokyo.com/en/outline.html>).

My visit to this center was an eye-opener for me. While I had an immediate urge to spread the word among people I knew about the work being done by these centers and to encourage them to visit, it set me thinking about how disaster mitigation has been viewed in Japan through history. This was the trigger to this article. Japan is a country ravaged by earthquakes due to its geological position on the planet – right above the meeting point of three tectonic plates. While there would have been major quakes from time immemorial, the earliest official record is supposedly of one in 599 AD in Nara in western Japan during the reign of Empress Suiko. Detailed records are maintained in Japan of the numerous subsequent quakes (https://en.wikipedia.org/wiki/List_of_earthquakes_in_Japan).

Doing justice to such an extensive – though unfortunate – historical trove, the scope of a topic on disaster mitigation could well be based upon several years of research. Not having the luxury of either time or effort for an extensive treatise, I picked up just a couple of points that caught my interest. It is these that this article focuses on.

“Beware of Fire”

Earthquakes bring in their wake enormous destruction, human injury and death. However, in Japan, more often than structural collapse was the havoc created by tsunami and fires in the aftermath of temblors. While tsunami are a direct result of earthquakes which may not have even occurred close by (as was proven by the Indian Ocean tsunami of 2004 which occurred off the Indonesian island of Sumatra and had a severe impact on several of the Indian Ocean rim countries from Indonesia in the east to South Africa in the west), fires have been the bane of wood-intensive Japan from causes not just limited to earthquakes.

Especially on winter nights in Japanese towns when the air is extremely dry, one may hear a small group of residents walking the streets while clapping to a set rhythm with a pair of wooden claps and shouting “*hi no youjin*” (meaning “beware of fire”). This is a community disaster-mitigation fire awareness procedure which may have begun in the 15th or 16th century and continues to this day, more so in highly forested areas and smaller remote towns. The kanji characters for *hi no youjin* – 火の用心 – have become synonymous with disaster prevention. While one cannot prevent an earthquake, one can certainly take steps to reduce the accompanying damage. Such is the principle of *hi no youjin* (Photo 1).

Photo 1: Author



Be aware of fire

Photo 2: Author



MSL marker at Kimigahama

Of Soy Sauce & Tsunami

World-famous Japanese soy sauce is said to have had its origins in the Kii Peninsula of present-day Wakayama Prefecture in western Japan in the 12th century, when a monk while teaching how to make a certain type of *miso* paste erred and the accidental outcome was a delicious sauce – the ancestor of present-day soy sauce. About three centuries later, a local businessman, Gihei Hamaguchi, identifying a business opportunity, moved closer to the upcoming national capital of Edo, 600 kilometers to the northeast, to the fishing port of Tokawa on the Pacific Ocean, near present-day Choshi in Chiba Prefecture. This area thus became famous for Japanese soy sauce.

The Hamaguchis across further generations maintained a presence in both Choshi and Kii and in both business and politics. A seventh generation descendant, Goryo Hamaguchi, while governing in his native Kii region, identified a tsunami threat in the aftermath of the 1854 Ansei-Nankai earthquake. To enable villagers to evacuate to safety in the dark of night, he ordered that stacked sheaves of harvested rice drying in his own field be set on fire. This quick action saved many lives. He followed this up by having a seawall – the Hiromura Embankment – constructed from his own funds to protect the village from future tsunamis, thus generating income for the villagers who had lost their livelihoods in the natural disaster. Goryo Hamaguchi has been immortalized in the book *Inamura no Hi* (English version: *The Burning Rice Fields*).

Close to Tokawa is the Kimigahama sea face. In 1677, the Enpō-

Photo 3: Author



Obata Pond at Inubo

Photo 4: Author



Cabbage fields of Kimigahama

Boso-Oki earthquake triggered a tsunami estimated to have been 17 meters high, which crossed Kimigahama, ravaged a pine forest on the adjoining sand dunes, and reached Obata Pond a kilometer away. This land today is occupied mostly by luscious cabbage fields. Blue markers on utility poles specify the height above sea level and many have “Beware of tsunami” warnings in locations that could become subject to tsunami disasters. Both Goryo Hamaguchi and his ancestor, Gihei, would have been impressed (*Photos 2, 3, 4*).

Tremor-Resistant Architecture

Modern Japan probably has the best know-how in the world today on earthquake-resistant architecture. This has been achieved through regrettable but unavoidable experience, constant observation, analysis, research, development and dogged perseverance. Multi-storied residential towers dot the Tokyo cityscape and with ever-increasing excellence in earthquake technology, the height of the towers and their numbers is increasing. The threat of tremors is of course ever present.

Elegant five-story pagodas can be seen at several places in Japan. While the original architecture arrived from China over 1,000 years ago, there were architectural modifications done in Japan. The ancient five-story pagoda (*Gojuunotou* in Japanese) has lent itself to the study of earthquake-resistant architecture. The reason for this is that none of these wooden structures has suffered serious damage during tremors. Even in the Great Hanshin-Awaji earthquake of 1995 which destroyed several concrete structures in the Hyogo area – including high-speed expressways – the oldest five-story pagodas in

the vicinity of that region stood pretty safe and sound.

A highly rudimentary overview of the architecture of these pagodas is that there is a central column that stands from the base to the top of the five stories. An ornamental structure – resembling a lightning arrester – stretches upward from the top of the central column. In the original architecture from China, this central column was buried in a deep hole in the ground. Instead, in the Japanese version, it stands on a stone base in which it has some freedom of movement. Each of the five stories is capped by slanting roofs with deep eaves. The entire structure is wooden. There are many complex joints connecting the wood members. No nails are used. Each story, including the main structure, is rather independent without any pillars locking them to each other. Thus the structure in its entirety enjoys a fair degree of movement due to the independence of its parts, pretty much like one of those balancing toys that amuse both the young and old. In the event of the ground shaking, there is a sliding effect between the parts with the least friction. The whole structure can oscillate like a snake doing a standing dance.

I visited a five-story pagoda to experience it from a viewpoint of architectural wonder. The site I selected was the one in the foothills of the Haguoyama mountain in Yamagata Prefecture, 400 km from Tokyo. The nearby mountain, one of the major three of the Dewa Sanzan range, is an acclaimed spiritually charged power spot. The mountain range is home to mountain ascetics, known as the *Yamabushi*. Nestling in the hilly woods, this ancient pagoda is an epitome of elegance. Japanese architecture has done well in learning from the ancient. The modern Tokyo Skytree, built in 2011, follows the architectural principle of the five-story pagoda (*Photo 5*).

On my return from Haguoyama, in the nearby town of Tsuruoka I chanced upon a cozy Japanese eatery run by an elderly couple. They said, “This region suffers less from natural disasters compared to other areas of Japan, as it is protected by the Spirits of Dewa Sanzan.” May their words ring loud and strong. Indeed, the path to safety is in human endeavor coupled with the mysteries of the unseen.

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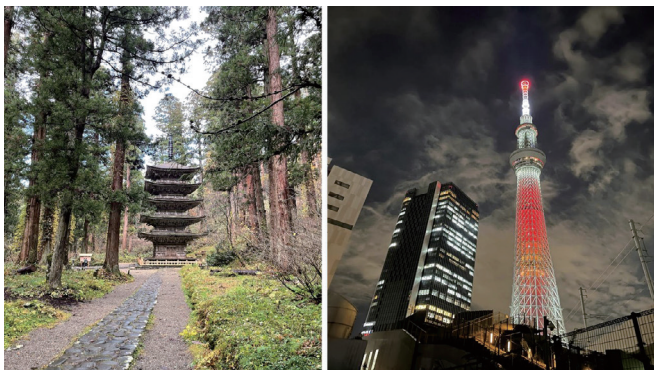


Photo 5: Author

Towers ancient & modern: Five-story pagoda of Haguoyama & Tokyo Skytree

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