



Dear AIA Colleagues:

In the wake of the series of disasters that fell on Japan two weeks ago, we have received many e-mail messages expressing concerns, sympathy, and condolences to the victims and those who were tragically affected. At the same time, everyone assured to us their support for not only us, but for the people of Japan in general, to get on with life and rebuild what has been lost.

I would like to send, on behalf of AIA Japan Chapter, our gratitude for your sincere and immediate expression of support and camaraderie. It was an eye-opening experience for me to realize that I am indeed part of a large professional community with very personal and human compassion. I would also like to give you a summary of the situation here some three weeks after it had all started, from the viewpoint of someone on the ground (though not in the area directly affected) to supplement all the reporting you must be receiving on the American media. The following is a compilation of what I saw, heard, read, and gathered through my personal experience, TV reporting, newspaper and magazine articles, and web-based media.

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President AIA Japan

March 30<sup>th</sup>, 2011 in Tokyo

## ■ Mechanics of Earthquakes

On March 11<sup>th</sup>, at 2:46PM, three giant earthquakes occurred along the edges of the tectonic plates at the ocean bottom on the Pacific coast off the Tohoku (literally meaning “northeast”) Region. Initially it was assumed that there was one big earthquake, but with the analysis of seismic movements, scientists confirmed that there were indeed three gigantic earthquakes occurring in tandem within six minutes of each other, destroying the earth crust in the length of approximately 500 km (310 miles) in length and 200 km in width, similar to the earthquakes off Sumatra in December 2004. The monstrous tremor continued for more than 5 minutes in many locations, which was unprecedented, with a combined magnitude of 9.0. It moved, for example, Oshika Peninsula to the east of Sendai by 5.3m (17’4”) to east-southeast and sank it by 1.2m (47”); and the shift in the land mass increased the oscillation of the earth’s rotational axis by 17cm (6.7 inches) and made the day 1.8 microseconds shorter. It was also accompanied by horizontal sheer displacement of 20m (65’7”) or so, and more deadly, 3-4m (10-13’) of vertical displacement of the ocean bottom, which produced tsunami waves, which reached all the pacific coasts of Japan and as far away as Hawaii and Chile, and other countries.

## ■ Casualty

As of today (March 30th), we have counted 11,232 people confirmed dead, of which 8,799 were identified (and 8,412 were taken back by the families), and 16,361 people reported missing. (This figure of course does not include those who are not “reported” missing; i.e., if the entire family / household is wiped out, there is nobody reporting the missing.) There are still 174,367 people living in 2,065 temporary shelters.

Japanese law requires that the dead be cremated in principal, but the gov’t has declared an emergency measure allowing for regional gov’ts to have them interred if consented by



the next of kin. The process has started in the coastal communities where the municipal cremation facilities were damaged by tsunami or are inoperable due to a lack of fuel.

As the debris are cleared away, they are sure to find many more bodies in hundreds and thousands in the tsunami hit regions. And still, there will be many whose bodies will never be found as they are carried out to sea, which will pose a significant emotional stress to the survivors

## ■ Tsunami

As you may know, the great majority of those who died or are missing were victims of giant tsunami waves that came about 15-30 minutes after the initial shock of earthquakes. In most locations, the government had predicted the maximum possible tsunamis to be 4-6m (13-20') tall. In reality, the waves reached and destroyed 10m tall levees and washed over the rooftops of school buildings that were 3 to 4 floors high. There are water marks at 14-20m (46' – 65'7") above ground on structures still standing. When a wall of water hit, its destructive force was enormous; all the wooden structures were washed away and only concrete structures remained standing, but their windows and doors smashed. Even parts of anti-tsunami levees were destroyed and pieces were "carried" in-land by the force of water. A tsunami wave, when rushing on shore, is not just a volume of water; it carries debris, cars, trains, fishing boats and what not, which become a massive group of projectiles that flow around destroying everything on their way, and take victims far out to sea when it recedes. The only way to survive a tsunami is to get up to a higher ground before it reaches you.

In tsunami hit communities, there are reports that many people in the coastal community did not rush to high grounds after the tremor because they had been accustomed to the "crying wolf" of tsunami alarms, and had a false sense of security with massive "state of the art" anti-tsunami levees built along the shorelines, which were in a sense proud symbols of technological progress and political maneuvering (in pork barrel project budget). On the other hand, many of the victims had put on layers of clothing, and had backpacks on full of underwear, food items, cash and bank books, and the official seal (which the Japanese use for transactions instead of signature), indicating tsunamis caught up with even those who were fully aware of the urgency of leaving the coastal areas.

Depending on how far the epicenter is, tsunamis take time to reach the shore, anywhere from 10 minutes to 2 hours to an entire day. If you have felt a strong earthquake and if you are close to the sea, you should drop everything and go for a higher ground. (The tragedy around the Indian Ocean in December 2004 was caused by the distance; no one felt the earthquake, and without a warning system along the sea side communities, people did not suspect anything unusual until tsunamis arrived the day after the earthquake that triggered the massive movement of water on the other side of the ocean. The only premonition they should have noticed was that, oftentimes before a massive tsunami reaches the shore, the water recedes first far out off the coast. Unfortunately in those resorts, people thought it was a great opportunity to go out to see fish stranded on the sea bottom.) In reality, however, there were elderly, who had mobility problems. There were people who wanted to go back home to see if their family members were alright after the big shaking. Those who were driving may have gotten stuck in traffic in narrow streets. Those people wasted the precious 15 to 30 minutes they had after the initial earthquakes.

In schools after the earthquakes, children were sometimes evacuated to a higher ground behind them; sometimes led up to the roof of their own buildings. One reported story has it that, even after having evacuated to the rooftop, a teacher was listening to the radio



report of the height of tsunamis coming to a nearby fishing village, and noticed that it was much higher than the height engineers had told the town people to be the highest possible. He then alerted the children to go further out, away and higher, which saved many lives.

In some cases, people were witnessed literally riding over the torrent on tatami mats, floating cars, or even inside their own houses. But in the end, most of them perished as they were pulled into the water, tossed upside down, or hit hard at standing structures. Survivors say the pull of the water current was so strong that they clung to whatever they could reach to literally for dear life. Some survived like a James Bond movie, but most simply drowned quickly. We still do not know how many bodies were carried out to sea that day.

We hear news of towns of population 10,000 to 15,000 people being able to account for only 5,000 or 7,000. The rest is presumed dead either buried under the debris or lost to the bottom of the sea. In fact an account of a woman rescued by a helicopter has it that she saw hundreds of bodies and fragments thereof floating around her as she was lifted up. It must have been a hellish scene. Japanese TV and magazines show only sanitized pictures; i.e., never a corpse appears in a published picture out of respect for the victims. I wonder about the traumatic effect on small children.

Japan has built so many “tsunami evacuation centers” along the coast. However, with tsunamis of this magnitude, all of these centers look too small, too short, and too weak. The ubiquitous concrete levees destroyed the beautiful seashore sceneries, cut-off the fishing community from the sea, and still did not protect the communities as planned. Many of the communities hard hit this time have a history of tsunami damages in the past so many centuries; yet the government as well as the local people believed in the power of engineering over the power of nature; causing devastation again. **The only way not to repeat the mistake seems to rebuild the community on a higher ground, somewhat away from the waterfront, and have only the fishing industry related structures and park spaces (and the tsunami warning system) near the water.** A 1000-year tsunami may not come again next year, but the decision they make this year could bring great sorrow to the descendants of the next generation or one after that.

## ■ Fukushima Daiichi Nuclear Plants – What Happened and What Is Happening

Of the six reactors at Fukushima Daiichi Nuclear Plants, approx. 230km (143 miles) north-northeast of central Tokyo, the units 4-6 were under regular maintenance, and the reactors were not running at the time of the earthquakes. The units 1-3 were running, but the automatic shut-down mechanism worked to insert the control rods into the nuclear fuel to shut off the fission reaction within the reactors. However, the temperature of the fuel rods must be under constant control by way of circulating coolant water, which rely on electric pumps. When tsunamis hit the area sometime afterwards, which were at 14m tall while the facility was designed with the maximum tsunami design height of 5.7m, the compound received physical damages as well as water damages on the electrical systems. The emergency back-up generators as well as the reactor buildings were installed with the grade level at around 10-13m above sea level.

The supposedly “fail-safe” back-up cooling systems, thus, all failed, and, while the nuclear reaction itself was somewhat controlled, the fuels kept releasing what is called decay heat. Tokyo Electric Power Company (TEPCO) immediately connected fire-fighting pumps to directly introduce sea water into the reactor vessels (the inner-most casing of the reactor fuel rods where steam is generated) to keep fuel rods from overheating. But they suspect that in some reactors, the water level within went so low that much of fuel rods were above the water level, causing overheating, damaging the fuel rod casing (zirconium



alloy tubes), and raising the radioactive water vapor pressure inside.

Another menace was the spent-fuel pools, which are built above the reactors. Spent fuel rods must be taken out of the reactor, and be submerged in water in these pools for 4-5 years to really cool them down before they can be stored in “casks” for permanent disposal. This requires again moving coolant water. These pools are less well protected than the reactors; the only shield above the pools is only one layer of the building walls. As the electrical system failed, the water circulation stopped, raising the water temperature, and eventually evaporating it to expose the, though spent still radioactive, fuel rods to air.

There were hydrogen explosions in units 1 and 3. When zirconium gets very hot, it reacts with oxygen, releasing hydrogen. As the pressure within the containment (two-meter thick concrete structure housing the reactor vessel) rose to a dangerous level, TEPCO opened valves to release some steam inside. Hydrogen was released with it to the space above the containment but inside the building envelope. At some point, the hydrogen concentration was at such point that some electrical spark or something ignited it and caused explosion.

These explosions provided sensational TV pictures of mushroom clouds raising above, which sent alarm to the entire world. Very important facts here are that the explosion was not nuclear explosions, but hydrogen explosions, and that they occurred above the concrete containment, and it is unlikely (well, at least TEPCO and some scientists say) that they damaged the containment or the reactor vessels. Though a critical state continues, these explosions themselves were not catastrophic events.

## ■ Fukushima Daiichi Nuclear Plants – Restoration Efforts

After the building envelope of units 1 and 3 were breached, they realized that the spent-fuel pools were problematic; white steam-like clouds hovered above these units. In order to counter the possible situation where the water may be evaporating and the fuel rods exposed to environment, they (TEPCO and government) attempted first to use helicopters to pour sea water from above. Self Defense Forces (SDF) helicopters did this job a few times, but the radiation level was so high above these units that they could not come too low and the water was dispersed in the wind. TEPCO's own fire-fighting squad tried to use their equipment to shoot water from ground with some success. Eventually the US military offered their fire engines, too. Then Tokyo Municipal Gov't's fire department with fire engines for tall buildings joined the group. They have not only the water shooting capability for tall buildings, but also some equipment to extend the hoses for 1.5 miles or so with a pump vehicle in between. This greatly extended the amount of time during which the water jets may be applied. The workers still had to count their overall cumulative exposure to radiation, and after having reached the allowed maximum, had to be replaced. Eventually the fire squads from Osaka, then Yokohama, then Kawasaki took over the positions and kept pouring water to those troubled units throughout the week. Along the way, two private companies offered German-built pressurized cement pouring equipment, which can shoot water from even a higher (52m) elevation. There are only four such equipment in Japan, and they are all there taking turns.

Because of the earlier explosion, the radioactive debris from units 1 and 3 were on the ground, which limited the activities there. SDF introduced two NBC (nuclear, biological and chemical warfare) tanks to clear the ground for easier access. These tanks are said to have thicker armor plates which reduce the radiation exposure level of those operating them inside.



In the meantime, TEPCO hurried to restore the electrical power supply. In the past few days, they were successful in installing a few miles worth of power cables from inland grid to several locations in the compound, rebuilt switchboards, and brought new power lines into the control rooms. They have also prepared replacement pumps and motors in case these mechanical elements have been damaged by tsunami. Their work has been hampered by occasional smoke coming off the reactor units and rising radiation levels, which cause them to retrench for a while. However, as of last Tuesday, the power has been restored in most of the control rooms, and they are testing the equipment and circuits to restart the cooling systems. Once the cooling systems go back up, and the measurement sensors are restored, the situation will improve dramatically. It would also provide lighting within these spaces, and HVAC would reduce radioactive particles in the indoor air, further facilitating the work of restoration. We are all hoping for success in the heroic work of the people on the ground in Fukushima Daiichi including 500 or so workers from SDF, US troops, police, fire departments of a few large cities, Hitachi and Toshiba (manufacturers of the reactors there) and their subcontractors, as well as TEPCO, many of whose locally stationed employees have lost their houses and loved ones themselves.

## ■ Rescue and Relief Efforts Offered by International Community

When the news of the devastation went around the globe, the international community did not wait to offer help to Japan. 133 countries and regions and 39 international organizations offered some form of assistance. Many countries sent teams of rescue experts who arrived quickly to search for the survivors of the earthquakes and tsunamis. China's humanitarian gesture surely turned around the escalation of animosity between them and Japan. So did Russian rescue team and the offer for extra LNG shipment.

The US continues to be active in providing logistical supports such as clearing of Sendai Airport, and providing fresh water to pour into the reactor cores at Fukushima Daiichi; and relief supplies to many isolated communities hard to reach on land. While many started to doubt the effectiveness of Japanese government, it was a big relief to see the image of USS Ronald Reagan off the coast of Fukushima. I hope this will also realign Japan's outlook on US presence in the Far East, which has been awkward ever since the Democrats took over the government a year and a half ago. Israel's team of doctors came in last night to care for the evacuees whose living conditions are detrimental to their health, while the local doctors are totally overworked. The US and France have sent experts on nuclear energy and radiology as well as miscellaneous equipment, protective gears, etc.

We have heard news of communities throughout the world raising money to help those affected and the rebuilding efforts to come, and are enormously moved. Some say they are returning the favor, which Japan had extended to them when they had a difficult time, such as earthquake, mudslides, and flood damages in the past. I think this will be a humbling experience to many Japanese who had thought Japan was a technologically advanced and materialistically wealthy country. The magnitude of these events was too big even for Japan to handle alone and we need these supports. At the same time, I feel happy to see that, while we all have differences, the humanity can at the very core of things still work to help one another. And I hope that because of this shock, the world will be a little more peaceful place to live in after this confusion has been sorted out in one way or another.

## ■ Life in Shelters and Isolated Communities

As of today, there are still 170,000 people living in shelters, and countless more in



communities that escaped the tsunamis or radiation contamination, but still in physically damaged areas within Tohoku.

Right after the earthquakes and tsunamis, people spent the night in temples, government offices, etc., but eventually they were received at designated shelters, which, in many cases were school buildings and gymnasiums, housing anywhere from 50 to 1,000 evacuees. Some simple provisions requiring only small added costs can make them more functional and comfortable for emergency uses.

## 1) Heat:

Because the shelters are not built for residential use, heat source is often inadequate or non-existent. Compounded with the fuel distribution blockage, many shelters lack heat in the sub-zero weather. There was a story of a bio-fuel venture company offering a special boiler, which provides hot water that may be circulated through hoses placed around the main space. It is a quick make-shift radiant heating solution, but of course it requires a boiler, hoses, and fuel.

For a future school gymnasium, it will make sense to incorporate such heating hoses (tubes under floor) and good insulation all around the building envelope so that it can reduce the suffering of people when and if it is used as a shelter for a minimal increase of the initial construction cost.

## 2) Sanitation

The shelter is only a shelter, barely better than sleeping outdoors. The space inside tends to be cold, and becomes crowded with people whose hygiene is not necessarily at the desirable level. There is a tendency to see cases of influenza spreading fast among the evacuees. Many wear a surgical mask, but it can prevent the germs flying around only so much.

Toilets are always a big problem. Those make-shift shelters do not usually have much sewerage capacity. Without running water supply and/or damaged sewer lines, they quickly overflow. People try digging holes in the ground outside, but of course they are not so comfortable, often soiled, smelly, and cold. As a result, people tend to take less liquid in an attempt to reduce the number of times they have to go to the bathroom, which can cause medical complications including what is so called the economy class syndrome.

Again, future gymnasiums and school buildings and public parks should have extra toilet capacity. Systems that are slowly adopted in public facilities include one where holes in the ground, at normal times concealed with steel plates flush on the ground level, are connected directly to sewer lines. A nearby storage shack would have quick-and-easy tents to provide privacy over each of them.

Gray water systems can provide for flushing toilets, shower/bathing possibility, and above-mentioned radiant heating systems, when the water supply lines are severed. They are a good investment in normal times, and can be precious resources in emergency, offering self-sustained water usage.

One thing to remember is that there is always a need for handicap accessible toilets. In TV news pictures I saw many "comfort castles" or portable toilets deployed to evacuation shelters. But none were accessible. Accessible toilets were only recently incorporated in the Building Code in Japan; I suppose there are very few accessible portable toilets here.

## 3) Bedding



The gymnasium floor is hard and cold with little insulation. In an emergency like this time when people barely escaped the onslaught of tsunamis, they have literally have nothing with them. Minimum bedding must be provided for somehow. Even a thin sleeping mat for camping would help isolating the cold coming up from the floor. Sleeping bags can be added to the list of relief supplies to be stored by municipalities. Blankets can be of very light weight, high-tech material that we see in sporting events. Is there any way of incorporating light-weight insulating materials with the finishes of walls and/or ceilings in these public buildings so that they can be dismantled and placed on the floor?

As the magnitude of devastation goes up, the length of stay in these shelters inevitably becomes longer. The stress of spending two, or three, or four weeks in a crowded room and sleeping on hard floor can weaken the already weak. When we plan for a shelter, we tend to think about the immediate relieve of water and food; but equally important is the consideration for how to sustain the lives of those who survived for some prolonged period of time, as the temporary housing projects will take time (6-12 months) to accommodate everybody.

#### 4) Privacy

Tens and hundreds of people cramped into a large space would inevitably suffer from a lack of privacy. This condition would exasperate the stress level of those who are already experiencing the sense of loss, displacement, and fear of uncertainties.

In some cases, elderly with mobility impairment and/or excretory difficulty would hesitate to move into a shelter lest their bodily odor might bother others or their conditions in general would make themselves "unpresentable" to strangers. So would parents of children with mental problems, who might panic in an unfamiliar environment and cry or shriek or run around, etc.

Shigeru Ban has proposed a light-weight system of paper tubes and fabric to erect temporary partitions. This system would work well under certain circumstances. Is there not something that can be incorporated into the building itself that would help? Maybe something as simple as extra rope rings along the upper portion of walls of such spaces, where ropes can be tied to hang whatever fabric or panels people can find when the time comes? Architects have to use their imagination.

#### 5) Governance

In many shelters in Tohoku, it is reported that spontaneous, self-governing bodies have been established. This reminds me of the Chilean minors trapped underground for so many days. There would be rules all are expected to abide by, routines and responsibilities assigned to sub-groups, such as cooking, distribution of rationed supplies, overseeing small children in the designated play areas, tending whatever few kerosene heaters they have, cleaning toilets, and so on. In large shelters, you may find clinics with doctors and nurses, and mental care therapists, who themselves are evacuees. Sometimes city hall employees take up a role, but they say it is better to leave matters to the hands of residents because in any given shelter, the evacuees are likely from the same or nearby neighborhoods and know each other. There are often leadership figures and the order is rather naturally restored.



## 6) Information

Many evacuees are separated from their family members and still do not know if they are safe. Cell phones and land line phone system were restored only sporadically after a week or so. Those who cannot get reconnected are still searching with a hope that their loved ones are alive in a different shelter or hospitalized somewhere. At the same time, some municipalities provide daily bus rides to the morgues so one can visit the dead in order to identify them.

Many evacuees do not have access to TV or internet. So they cannot watch the non-stop coverage of TV and news media. Especially in Fukushima, the nuclear plant accident followed the earthquakes, but the **evacuees are not well informed of the ever changing situation there.**

Right after March 11th, with all the phone systems out, internet was the only means of communication. **Twitter and Facebook are said to have been very useful to spread real-life information to cell phones. However, there are many who do not use such systems, and after the cell phone batteries die, the information stops flowing, too.**

Coastal communities typically have a loud-speaker communication system installed. But it was knocked down by the earthquake or tsunami. It is therefore desirable to come up with a stable public information infrastructure taking advantage of today's technology.

## 7) Food Supply and Preparation

Those who escaped the tsunamis in stranded buildings and rooftops literally had to wait for rescue for a whole day, if not longer, without food or water. Even after having been admitted to the shelters, the delivery of rations was delayed so that the conditions did not improve for more than a few days. People shared what little food they had, and eventually relief supplies started to arrive.

**Most shelters lack cooking facilities. Even if people had access to a kitchen, there may not be power or gas available.** Therefore in early days, food items that can be served without any preparation were important.

As soon as the cooking becomes possible, Japanese shelters tend to serve rice balls and miso soup. **This would help a great majority of evacuees, but there was a story of children with food allergy. Those special needs people have to be accounted for by the community and/or local government.**

## 8) Other Supplies

After the initial rescue efforts are over, the reality of everyday life comes back. **People who have food allergy or rely on daily doses of medications have lost their stock in the confusion. Local hospitals would run out of their stock very quickly without replenishment. For people with such needs, the ordeal in shelters becomes much harder than others.** Those who require regular dialysis procedures had to be evacuated to hospitals in different parts of the country, which worked this time, only thanks to a network of hospitals established by a handful of private doctors who had prepared procedures for just such situations. **Babies and pregnant women have their own needs, so do people with handicap in their mobility or intellectual capabilities. This reminds me of the fact that we all depend on the modern day networks of everything from food to medication to information to energy sources to banking to municipal services to everything else.** Disasters hit not when everybody is able to cope with the ensuing hardships; the





preparation must be planned and designed to address needs of people with special needs while trying to help the maximum possible number of general public.

Some groups had to move several times in the past two weeks. From the administrative point of view, it makes sense to consolidate smaller shelters so that the delivery routes can be rationalized, and fewer locations would have to be taken care of. Authorities say that they learned after the Kobe Earthquake of 1995 that it would be better to relocate, if necessary, neighborhood groups together so that evacuees would maintain the community bonds, leading to a better chance of supporting each other in the hardships they are to experience.

Regional governments have started the construction of temporary housing. However, some estimate says they will need 20,000 units. So far only a few thousands have been planned or started.

Some tragic issues;

- 1) There are many children whose lives were saved because they were still in school, which tends to be built on a higher ground behind the coastal fishing communities. Many, however, lost their parents. Children as young as 8 years old are wondering through the destruction of the city looking for their parents and siblings. If they are taken in by their relatives, they are lucky. In many cases, the whole clan perished in the sweeping force of tsunamis. Who will care for them as time goes on? Can governments establish any effective system to support them till they grow up? It is truly heart-wrenching.
- 2) There have already been close to 100 deaths of elderly after they had been admitted to shelters because of the cold, lack of medicine or medical equipment, shock of changing environment, or loss of care-giver in the family, etc. In some shelters, they have seen two to three such deaths per day for the past weeks. The dead are placed in a separate room because municipal cremation facilities are either destroyed or running at full capacity, and sometimes because their families cannot be found.

Community Based Migration;

A few communities literally lost their towns, town halls, and town hall employees. Whoever is remaining decided to move together to a shelter in a distant location. For example, the residents of the town of Otsuchi have been accepted to Saitama Arena, a multipurpose sports stadium only half hour north of Tokyo with a courtesy of Prefecture of Saitama. The town hall also moved here, and opened the town councilors' meeting yesterday. It is unprecedented, but today we all have to improvise. Communities especially close to the Fukushima Daiichi Power Plants are planning for mass migration, at least for a few years, before their home towns become habitable again.

However, while the residents are in a new community, they would have to find work. Once they are successful in starting new lives, they will have less reason to go back. Either way, their lives are greatly affected.

Many prefectures and municipalities in the western Japan have offered acceptance with provisions for travelling, housing rent waiver, and even start-up money. But emotionally, those who were affected still hesitate, naturally.



## ■ Logistics and Impact on Economy

The initial shocks destroyed some bridges, roadways, and railways, halting the distribution network of the Tohoku Region including Sendai, a city of one million people. The coastal communities north of Sendai are separated from the population centers along the spine of flat land in the middle of Honshu Island with mountains, and, thus, were rather difficult to reach even before March 11th. Then the destruction of accesses made the logistics an acute problem in the coastal region, where relief materials were needed the most.

The quakes and tsunamis also put more than a handful of oil refineries along the Pacific coast out of business, at least initially. This threw the fuel (heating oil as well as gasoline) distribution off balance in the eastern half of Japan including the Tokyo region.

These compounded problems made the logistics of rescue and relief activities very difficult. (See more on this below.)

The Tohoku Region also has many advanced technology manufacturing plants. With the physical damage and/or the disruption of transportation, many plants were forced to close down. Since many manufacturers had adopted Toyota's just-in-time delivery tactics for parts and half-products, once a plant stops production in upstream of the supply chain, the whole line of factories, even if they were located outside the earthquake affected region, had to be shut down with very few parts in stock. There is already a report of temporary workers laid off at a factory in Shimane, at the western end of Honshu, because of the stoppage of their suppliers in Tohoku.

Many fishermen lost their boats and nets in tsunamis. The Pacific Coast of Tohoku boasted numerous large fishing bases. We will have to wait and see how much impact this will have on our dietary needs.

The nuclear scare has prompted many foreign businesses to at least temporarily flee Tokyo or the country altogether. They seem to be coming back to Tokyo as they realize that it had been an overreaction. However, as the problems at Fukushima Daiichi linger, there will be a serious economic consequence in the region. At least the communities within the 30km (19 miles) radius are vacated with no end in sight. There will be thousands of jobless people from those communities at least. As they relocate to other communities, they become competition for jobs when already the recession has squeezed the job market throughout the country.

The shortage of electric power is worrisome because it disrupts manufacturing activities in many ways. The planned blackouts are marginally necessary now, but when the summer heat arrives, the power demand will soar with air conditioning. Industries are already talking about ways to reduce the peak demand by shifting the operation to night time, assigning specific days off to individual businesses instead of everyone taking the weekend off, etc. Japan adopted the policy called "Cool Biz" a while ago to encourage business people to take the tie and jacket off during the summer months and set the air conditioning at a higher temperature. I can imagine that Japanese businesses will become even more casual this summer.

The amount of damage in both private and public sectors will be enormous. At the time of Kobe Earthquake, the damage was estimated to be approximately 2.5% of GDP. This time, it will certainly be more. So, for a year or so, the overall economic output may be down. But the rebuilding work will eventually push the economy up a little. And since this emergency will likely convince the current government to give up on some notorious campaign promises, such as child subsidy, free high-school tuition, and rice buy-up for farmers, all designed to please local constituencies in support of the Democrats, but little



economic stimulus value, the governing principal may shift to more pro-business, which we need to pay for the rebuilding as well as to compensate for the shrinking and aging demography. Some intellectuals have already started speaking up about this disaster being a wake-up call, a great opportunity to put an end to the doldrums, and push reform in our societal problems such as the pension system, healthcare, centralized control by bureaucracy, high corporate taxes, rigid employment practices, uncompetitive education, etc. (See more in “What is to Come” below.)

## ■ Life in Tokyo and Elsewhere

### 1) Dress rehearsal for the Big One for Tokyo

In a sense Tokyo is arguably better prepared for a large earthquake than any other regions in Japan for an obvious reason. It is on flat terrain; no landslide. It is somewhat protected by the closed geometry of Tokyo Bay against onslaught of tsunami; some coastal inundation may occur, but the destructive force may be reduced. Recently built large buildings follow strict seismic building code; we really, really, do not believe that they could collapse. All nuclear power plants are located far from the city. Only issues I personally worry about are the raised highways, which were built quickly for the Tokyo Olympic Games in 1964, which may collapse in sections, and envelopes of smaller buildings that might fall off due to differential movement.

Government agencies had predicted that in case of a big earthquake on a weekday, the central districts of Tokyo would be paralyzed with people hurrying home, streets filled with people as if they were in rush-hour trains, while all the public transportation network would be suspended. Agencies recommend that workers remain at work and delay their attempt to get home as much as they can. Here is a collection of anecdotes of what happened in Tokyo on March 11<sup>th</sup>.

- Most businesses closed and let workers out. Some people walked hours to get home.
- Supermarkets and convenient stores (convinis for short) quickly sold out beverages, snacks, bento boxes (take-out meals). Fast food restaurants were all crowded until dawn; some ran out of food items, but let people stay.
- Sports equipment stores had brisk sales as people bought up sneakers and bicycles.
- Japan Railway train network (JR – formerly of national train system) was down from the time of the first earthquake on till next day. The subway systems came back up towards early evening, but, in order to maintain safety of passengers within the stations, they had to limit the number of people entering stations at a time.
- Government facilities (municipal offices, auditoria, schools) were open to those who needed shelters for the evening.
- Private schools, temples and shrines also opened their buildings, and some provided free water and food.
- Private homes also helped passers-by by giving access to well water, and distributing rice balls.
- Most people wanted to go home because they could not confirm the safety of



their family members. Others were worried about old parents or young children at home.

- Mobile phone communication was restricted by providers. Land lines were difficult to get through. Twitter and SNS services through internet provided many with live information (subway line status, shelter information, etc.)

## 2) Mood in the Streets / Anxiety at Home

After one week or so, Tokyo was still quieter than usual; weekdays looked like weekend. As the magnitude of the casualty in Tohoku Region became clear, people were in a sober mood. Even if they did not have any family members or acquaintances directly affected by the earthquakes and tsunamis, they were and are still in a collective mourning period, it seems. My wife and I were basically glued to TV all day long, which had, for a week or so, continuous coverage of all things related to March 11<sup>th</sup>. We would be jolted by occasional emergency earthquake warnings on TV, which warn the arrival of an aftershock within 10-15 seconds. Most festivities were cancelled, including, unfortunately many commencement exercises of schools and universities. (Japanese school year is from April to March.) (In fact, the first reported death in Tokyo was at an old government-owned auditorium in downtown Tokyo where the ceiling panels fell onto a group of teachers and students attending their graduation ceremony.)

## 3) Foreigners and Kids Exodus – The Panic Stricken Left the Town

This is quite unfortunate, but understandable; many foreign nationals left Japan or Tokyo in panic and/or by instructions of their consulates or companies. There was a rush in the first week of foreigners getting out. Most were scared of radiation; though some had an excuse of business interruption by power blackouts, or unpredictability thereof. Some European airlines diverted Narita (Tokyo) routes to Kansai (Osaka). Most of them have come back to Narita this week, but they still stop in Seoul or Taipei or Shanghai so that their crew does not have to stay over in Tokyo, nor their planes reload drinking water at Narita. I suppose the Japanese would do and probably did the same when, for example, SARS scare kept people away from Hong Kong and some other Southeast Asian countries a few years ago. But Japanese consumers may have a little negative impression of companies like some luxury as well as fast fashion brands who closed their stores and moved the headquarters to Osaka.

Mothers of young kids were also scared of radiation – especially of radioisotope of iodine (iodine 131), which tends to accumulate in the thyroid gland causing cancer in young children under ten. So far, the amount of iodine-131 found in atmosphere, water, and some food products in Tokyo is so miniscule it cannot have any lasting effect. Its half-life of 8 days also makes it relatively safe as long as one is not exposed to it for a prolonged period of time. However, mothers who “do not want to take risk”, or who do not believe in the government releases of daily iodine-131 levels took their children to western parts of the country or even farther away. Of my son’s grade school class, about one third of the pupils have been missing since Monday after the earthquakes. I would question the validity of this action considering the risk of traffic accidents, stress of living out of suitcase for a prolonged period of time, and detrimental effects of being out of school and out of touch with friends from school. ( The thyroid gland cancer epidemic in pre-teens around Chernobyl was due to their internal radiation exposure through prolonged intake of contaminated milk, which kept constant

replenishment of iodine 131 to unsuspecting children. )

In any case, the government is not doing enough to educate the public, nor convey accurate information daily to foreign media. The way they are handling the communication and public relations is so unprofessional that it only augments the mistrust of the authorities and suspicion that they are hiding something. In a case like this, quick, timely, and apt announcements must be released by authorities in order to avoid panic, sensationalistic public speculation, and eventually, unnecessary costs in lost businesses, in addition to preventing secondary loss of life and physical, monetary, and social damage to public and private properties.

#### 4) Planned Power Blackouts

Because of power shortage as a result of several power plants, fuel-burning as well as nuclear, going off line, TEPCO instituted planned blackouts, which initially caused much confusion especially for train services. TEPCO did not coordinate with the train lines so train companies did not really know when to operate which lines and the “planned” part is not that well planned, making it more unpredictable. Now people are somewhat used to it, but problems do happen;

- Traffic accidents at crossing with traffic lights not working, and the victims not being able to receive necessary CT scan, for example.
- Fire and carbon monoxide death resulting from the use of barbecue grills for heating within residences.
- Blood drives not being able to accept good will of those who want to help.
- Hospitals not being able to plan major surgeries, as small hospitals may have emergency power generators, which would last only a few hours, and now they face diesel fuel shortage, too.
- Some factories and shops require a continuous line operation. Disruption of such lines may mean a lower product quality. In many cases, a planned blackout of 3 hours does not mean 3/24 reduction in output quantity because it takes time to stop and restart the line. Some say a 3-hour blackout means 10 hours of production stoppage. Some factories are shifting to night time operation; others do not have this option if located in a residential neighborhood.

TEPCO says they are restarting old and decommissioned fuel-burning plants and installing extra gas turbines in existing plants to increase the power generation capacity; but are afraid that they may not be able to meet the peak demand during the summer months. Government is trying to figure out how to handle the peak situation.

#### 5) Save Electric Power Campaign

Government is also asking the general public and businesses to reduce power consumption. It is in general a good thing, but the streets look darker, businesses look less active. This has a negative psychological effect. For example, in subway stations, the fluorescent lighting may be turned off about 30%; many escalators are not running; backlit advertisement panels and directionals are turned off, etc. (However, the ambient lighting is still brighter than NYC subway.) Train and subway services are now running at about



70-80% of normal in terms of frequency. Restaurants are shortening their operation hours so you have to go home at a decent hour.

There has been a big scandal with the Central League of Professional Baseball, who once decided to open the season this week and start night games in their domed fields right away. It would use so much electricity for lighting and HVAC, of course, and it brought a government intervention. Now they gave up on the initial idea and will start the season later and do more day games.

## 6) Disruption of Heating Oil and Gasoline Distribution

The quakes and tsunamis destroyed some oil refineries along the shore line. A shortage of heating oil as well as gasoline was a big problem for these weeks. The Tohoku Region at the end of March is still cold with the temperature dipping below freezing often.

As the distribution is disrupted because of the confusion on the network, reduced production, or even in case of Fukushima prefecture, refusal of truck drivers to drive into the area near Fukushima Daiichi Plants, heating oil is not reaching those who need it most, and most shelters lack heat. In case they want to evacuate the region to stay with their friends and relatives, they cannot pump gas to their cars. And because there is no guarantee that one can get gas for the return trip, truck drivers are even more hesitant to take aid supplies to the region. The recovery and identification of corpse is taking so long partially because they do not have enough gas to operate available equipment to remove and clear debris.

Even in Tokyo, the city bus services are still reduced. There used to be long lines at gas pumps for a while. The gas situation is much better this week, at least in Tokyo, though.

## 7) Disruption of General Distribution Network

Because the logistics centers were destroyed in some cases, everyday goods and food items became scarce in Tokyo supermarkets and convinis for a while. The first to go was rice, pastas, pasta sources, potato chips and chocolates (!). Milk and dairy products are also gone from the store shelves. As the facilities were repaired, there was a natural shift to rush materials to the Tohoku Region to help the evacuees. The situation is much better in Tokyo today, most restaurants are open, MacDonald's and Starbucks are business as usual; but we still see shortages of milk, for example, and bottled water.

In the Tohoku Region where they need much matériel to support the displaced people and start the temporary housing building work as well as the work of community rebuilding, the distribution network is still not back to the full capacity due to the combined effects of fuel shortage, physically severed roadways and bridges, radiation scare, destruction of distribution and manufacturing centers, etc.

## 8) Business as Usual

In Akihabara last weekend, girls in maid costumes distributed discount coupons for their infamous maid cafés in the street as if nothing had happened. Yodobashi Camera (one of the major electronics gadget retailers) was just as crowded as usual, and its TV section was booming with customers buying new TV sets to prepare for the upcoming switch-over from the analog to digital broadcasting systems. For a while, everybody was stunned and shocked and



stopped. But for those who were not directly affected, life must go on, and the economy has to keep moving.

Because of the power shortage and blackouts, some disruption and reduced productivity are expected; but for those who do not appear on the news are basically back to normal and back to work. We seem to be, however, in a somewhat different zeitgeist from three weeks ago.

## ■ Japanese Psyche

Throughout this ordeal, foreign media have pointed out how civil Japanese people are even when faced with a great difficulty. In Tokyo that evening, people, deprived of the usual commuter transportation, walked home helping each other. Stores and restaurants offered free food and beverages. In shelters, people would line up to receive food, they respect the rules established by the self-organized governing body, and share chores and duties to run the place smoothly. Stores and gas stations offer whatever they have in stock at regular prices, never attempting to take advantage of shortage. When an octogenarian was rescued with her grandson after having been trapped in the tsunami destroyed and debris covered house for 9 days, she said to the rescuer “thank you and I am sorry for taking up your time.” There have been some petty thefts in stores vacated by storekeepers as reported in Sendai. But there has been no wide-spread plunder or violence in any part of the affected areas. Everybody in the entire country seems to be nice, kind, sincere, and exhibiting exemplary citizenship. I wonder if the crime rate in Japan went down in the weeks following the disaster as everybody was preoccupied with the unfolding events in Tohoku and Fukushima in particular, and if even criminals have lost the “evil” in them.

Probably people are truly in shock so much that they suppress the individual selfishness and greed; and subconsciously hoping to have a sense of belongingness to feel secure. Or, they know instinctively that they cannot have a disgraceful conduct because they would still have to live in and with the same community of people after all this has passed. Or, simply it is their nature to be kind and sympathetic to and respectful of others.

I am personally amazed to observe that the entire country seems to be aligned in the “help Tohoku” mode. The collective will power will definitely be needed to help those affected and rebuild the society and economy, while correcting the general course of this country. This emotional focusing is undoubtedly a result of the genuine love everybody feels for the suffering of the humanity. It is in fact heart-warming to see fund-raising drives everywhere inside Japan as well as in some remote countries.

But I feel a tinge of fear in the way the mass is turning in one particular direction, or feeling obliged to turn in one direction. The Japanese tend to align themselves to the perceived majority, without expressing own values. No societal issue is as simple as good or bad; but eventually, I am afraid, that the big voice will determine which way is good for the mass, and dissenting voices will never be heard in this mass hypnosis, which can be rather blind when controlled through deft maneuvering of information and public moods.

For example, there is an on-going mood that dictates that because people of Tohoku are suffering, the rest of the country should not be engaged in festivities. For a certain period of time, this may hold true, because many in other regions are indeed feeling sad, depressed, and in a sense mourning the loss of lives and all the misfortune falling on those who survived. People are in general still feeling the shock and will take some time to get back to normal. Along this logic, however, many events have been cancelled, be they sporting events, commercial events for children at shopping malls, release of popular



music titles, or even wedding banquets. People would go straight home after work, drying up the businesses of restaurants and drinking holes in town. If you insist on doing business as usual, you would be criticized as insensitive and/or disrespectful. I suspect that this must be quite similar to the mind-control (self-imposed or not) of the general public, which on surface supported the starting of war in 1920's, that it was a necessary and god-given right to invade China. A dangerous demagogue could represent the voice of the time, leading the mass to an unwanted course that nobody could reverse.

Japan will soon need constructive debates in figuring out in which way to take our country; what to do with nuclear energy, how to spend our finite resources in rebuilding economy while supporting unprecedented increase of elderly population, etc. Having a united front is not always good, and I hope the Japanese people have enough wisdom to know the difference between the feel-good patriotism under one banner and the responsibility in evaluating options and expressing opinions in a democratic way when the time comes.

In any case, we will have to resume our normal lives so that Japan becomes productive again.

## ■ What Is To Come

An enormous number of lives were lost. There are as many people still missing two weeks after the devastation had occurred and are presumed dead. Several coastal communities were literally wiped off the map. Hundreds of thousands of people lost their homes and some lead nomadic lives between shelters, not even knowing where they are going next. However, the people of the region and of the rest of the country have already shown the resolve to overcome all the difficulty and somehow find meanings in this tragic turn of events in the history. To pay tribute to the victims, and to find the right path for the rest of the population of Japan, we need to get to work and do many things right. No more wasteful petty skirmishes between political parties. No more indecisions about what to do to deal with the dwindling pension reserves and snowballing healthcare costs. No more turf wars between ministries sacrificing the quality of services to the populace. This series of events and the hardships Japan is experiencing in the aftermath should be a blessing in disguise, a warning against further procrastination, or the ultimatum telling us that we have no more luxury in dillydallying in addressing the problems we face.

On the ground, the recovery of corpse still continues along with the removal of debris and mechanical drainage of sea water remaining in areas that sank lower than the surrounding areas. In Miyagi Prefecture, the estimated volume of debris is said to be as much as 23 times the typical annual amount of waste disposal of the region. The cost as well as what to do with all that debris is a big issue. (They still try to separate materials manually for possible recycling, but inclusion of sea water complicates the process, and as to radiation tainted materials, there is not even a guideline for handling.)

Also hampering the process is the issue of ownership. Thousands of cars tossed around by tsunamis can be traced back to the owners at least on paper, but there are so many of them, and finding the ownership does not mean being able to contact the owners. Even house debris has shifted around; in most cases the owner of the structure and whatever found inside is different from the owner of the land on which they were found. The government finally issued a decree allowing for removal and disposal of vehicles and structures that are obviously non-functional. (Workers are still trying to safe-keep personal items, such as photo albums, in case the owners come back to retrieve them.)

Fishing boats pose an issue one notch more complicated. While the ownership can be identified sooner than cars, their bulk is much bigger. They require much bigger





equipment, and in many cases they could not be removed without damaging or taking down a building or two nearby. The national government decided to pay for removal of house and car debris, but somehow the removal of ships is said to be the responsibility of individual insurers.

In terms of architecture and urban planning, this could be a great opportunity to rebuild communities in the most desirable fashion; in a sense, a utopian opportunity. An optimum built environment suitable for new lifestyles that are ecologically sound, symbiotic with the natural forces, based on a new paradigm in economic growth represented by knowledge based industries in addition to the traditional piscatorial, agricultural, and manufacturing industries.

These will all depend on the vision of the leadership, whoever might take that role at all levels in all fields. It remains to be seen whether there will be a centrally concerted efforts to produce a grand master plan for the Tohoku Region, or each township will employ architects and planners and hurry to implement a hodgepodge of rebuilding projects.

Japan Institute of Architects, of which I am a member of the international committee without being a JIA member, has mobilized some members in the region to help municipalities in the initial assessment of building damages; i.e., safe, repair needed, unfit for occupancy, etc. While the Japan Society of Civil Engineers, The Japanese Geotechnical Society, and the City Planning Institute of Japan have issued a joint communiqué, JIA has not made any public announcement.

I have been using all my imagination to figure out what an architect can do in an emergency situation like this. For example, we see in news coverage how selflessly some people are working as rescue workers, doctors, nurses, mental health counselors, truck drivers, city hall employees, journalists, construction workers, police and military. Unfortunately, what we do as architects does not seem to be so urgently needed in the confusing reality of affected areas.

However, when the rebuilding starts in a few months time, architects should provide leadership and creativity in master planning of old and new communities; propose extra safety measures in buildings of different types, and promote economical and eco-friendly solutions. This may indeed be a good opportunity to really promote green architecture.

Even for temporary housing projects, for which the economy and speed tend to take precedence over all other issues, architects can intervene in the planning process to give something extra for the comfort of future residents, such as a plaza to foster neighborhood communication, small spaces for meetings, thoughtful site planning for maximum privacy between units and separation of pedestrian and vehicular accesses, etc.

Architects have to work with professional groups like JIA and AIA to have our presence noticed and our expertise appreciated. Our profession, at least in industrialized countries, is there to give an added value to the built environment. It is important to remain concerned and actively engaged in order to offer our expertise especially when the harsh reality of the conditions of the affected tends to highlight the bare minimum hardware, and overshadow that little extra, which would make their lives much more livable in a long run.

AIA Japan Chapter is a very small chapter with very little resources. We may not be able to do much as a group vis-à-vis the disaster. But at least we can try to identify and convey the issues we are facing, and provide opportunities for discussions for professional awareness of and possible solutions to such problems through our upcoming Northwest Pacific Region / COD conference in Japan in November.