PROPOSAL FOR IMPROVEMENT OF BUSINESS CONTINUITY MANAGEMENT (BCM) BASED ON LESSONS FROM THE GREAT EAST JAPAN EARTHQUAKE

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For most Japanese companies and organizations, the enormous damage from the Great East Japan Earthquake (GEJE) was greater than expected. In addition to the great tsunami and the earthquake motion, the lack of electricity, fuel and other supplies disturbed recovery efforts and activities for business continuity. This should be considered an important constraint factor of large earthquakes. The Japanese government and industries should utilize the lessons of the GEJE and execute effective countermeasures, considering the concern of other great earthquakes occurring in Japan in the near future.

Of the countermeasures, improving the earthquake-resistance of buildings and facilities is the most basic approach. In addition, the spread of a BCP (Business Continuity Plan) and BCM (Business Continuity Management) to private and public organizations is also indispensable. Based on the lessons of the GEJE, BCM should more clearly include the standpoint of supply chain management, and emphasize “alternate strategy” more. The central and local governments are requested, in addition, to develop their own BCP and to prepare prerequisites for the BCM of private sectors, such as showing damage estimations in detail and improving related frameworks.

Key Words: BCP, BCM, the Great East Japan Earthquake, supply chain management

1. INTRODUCTION

The Great East Japan Earthquake (GEJE) of March 11, 2011, was caused by the movement of several plates in coastal and offshore areas of Tohoku and Kanto districts. According to government expectations, the probability of such earthquakes occurring was very low.

In addition to the direct damage from the ground’s motion, the tsunami and ground liquefaction, shortages of electricity and fuel occurred in all parts of east Japan. Furthermore, the resultant halt of supply of parts, materials and services by damaged companies disrupted the supply chain and the disruption spread to businesses throughout Japan and overseas as well.

This was the most serious situation to threaten business continuity in Japan in the past several decades. This should be a factor for foreign countries to distrust the reliability of production and supply systems in Japan.

As there is considerable concern over major earthquakes such as the Tokai Earthquakes, Tonankai-Nankai Earthquakes (both kinds are ocean-trench earthquakes in the Pacific Ocean coastline area) and Tokyo Inland Earthquakes, Japan is already known as an earthquake-prone country overseas. If Japanese private and public organizations do not learn the lessons of the GEJE and take measures including Business Continuity Management (BCM) quickly, there would be no way to clear anxieties about Japan’s production and supply system in a time of disaster, and might lead to avoidance of producing in Japan or procuring from Japan.

Based on this realization, this paper will discuss the factors related to damage to companies, organizations and industries caused by the GEJE, with emphasis on the supply chain and BCM, and propose measures to reduce such damage and improve business continuity plans (BCP: a plan for executing
BCM) of Japanese companies in future.

2. PREPARATION OF COMPANIES FOR DISASTERS BEFORE THE GEJE

(1) Companies’ disaster reduction plans and BCP before the GEJE

Japanese companies and organizations have been working on “disaster reduction” efforts even before the GEJE. The efforts generally include ensuring safety of customers and workers, securing quake resistance of buildings and contributing to local communities in times of disaster.

On the other hand, the BCP has been widely adopted in Japan only in recent years. Business Continuity is defined as “Selecting indispensable critical operations for an organization, making them available to recovery in a tolerable time, or preventing them from disruption if it is not acceptable.”

The Cabinet Office of the Japanese government conducted the “Survey on the Actual Situation of Companies in Business Continuity and Disaster Reduction” in November 2009. 736 companies responded. Of the major companies, 55% had completed a “disaster reduction plan” (which includes a BCP in this survey) and 25% were in the process of formulating one. Among the medium-sized companies, these numbers were 36% and 15% respectively.

(2) Progress of external dependency of production activity

In Japan’s production process, external dependency and outsourcing have grown as part of efforts toward rationalization and efficiency. Much of the production of parts and raw materials is outsourced, and supply of essential utilities such as electricity, gas, water, and telecommunications depends on external providers. Fig.1 shows an image of the external dependencies of a manufacturing company. As a result of dependency, even if a company sustained limited damage, the company would unavoidably have to halt its own activities almost simultaneously with their suppliers who suffered serious damage.

In addition, since these suppliers are increasingly dependent on other companies’ activities, the supply chain becomes longer and more complex. In fact, just after the GEJE, disruptions of this long, complex supply chain had considerable influence on the production of many companies which suffered no direct damage from the GEJE. Therefore, the need for supply chain management and BCM has increased.

3. BUSINESS DAMAGE OF THE GEJE

(1) Influence on businesses in damaged areas

Tohoku Economic Foundation (consisting of 900 member companies in 6 prefectures) conducted “the Questionnaire Survey on the Effect of the GEJE” during July 5-15, 2011 and received 245 answers (64 from manufacturers, 181 from non-manufacturers, a response rate of 36.3%). 73.4% of manufacturers and 74.0% of non-manufacturers responded that there was some damage to their buildings or facilities (Fig.2). These numbers showed that there was much...
physical damage caused by the earthquakes and the tsunami.

Additionally, 51.6% of manufacturers and 53.6% of non-manufacturers responded that they had indirect damage. As to the details, 42.2% of manufacturers noted an “increase of cost by the change of logistics network”, 29.7% noted a “decrease of production by disruption of supply chain,” and 20.3% noted a “price increase of fuel and raw materials.” For non-manufacturers, 22.1% cited a “decrease of sales by voluntary restraint of consumption,” and 16.8% cited a “price increase of fuel and raw materials.”

(2) Influence on companies in Tokyo

In Tokyo, the GEJE registered a seismic intensity of 5 upper and 5 lower on the Japanese seismic scale. Although only a few buildings collapsed, the railways were stopped for checking and repair for half a day or more. The Japan Railway (JR) was not able to operate until the next morning. As for road traffic, Metropolitan Expressways were closed for checking. Severe traffic jams occurred in main roads in central Tokyo, and buses and taxis were able to operate limittedly, while there was excessive traffic demand for them.

There were so many people who had difficulty returning home. It was estimated that 3.52 million people were not able to reach home that day, March 11; 40% of people away from home. Many of them tried to go home on foot. Downtown and on the way home, they needed rest places, and government units and many private organizations prepared them with a sense of urgency.

From March 14, the Monday after the GEJE, “planned outages” started. This was the electric supply halts by rotation in Kanto and Tohoku districts (except most of the 23 ward areas of Tokyo), and continued to March 28. Additionally, restriction of operation blocks of railways and reduction of train operation were executed to save the electricity, and commuters faced severe traffic congestion and delay in Tokyo.

(3) Influence on major businesses nationwide

Several days after the GEJE, a serious lack of fuel such as light oil and gasoline occurred in the whole of east Japan, not just in the damaged areas, and continued to the beginning of April. The problem was caused by stoppage of operations by two-thirds of oil refineries in the coastal area from Tohoku to Kanto district, and confusion in fuel distribution. However, in the governments’ damage estimations of major earthquakes, lack of fuel in a wide area was not a focus.

In stricken areas, the shortage of fuel caused delays in recovery works and transportation of necessities. Moreover, it was also a serious hindrance to activities covering wide areas, such as transportation of relief supplies and transfer of goods and persons for business continuity.

In addition, it became difficult to get food to be preserved, mineral water, dry-cell batteries and so on in all parts of east Japan. These situations did not ease until the beginning of April. Many celebrations, festivals and other events were restrained voluntarily, out of consideration for the sentiments of disaster victims.

About one month after the earthquake, on April 8-15, the Ministry of Economy, Trade, and Industry (METI) conducted its “Emergency survey on the actual status of industries after the GEJE” directed at 80 major companies (55 in manufacturing and 25 in retailing/service). Of the manufacturing businesses located in the damaged areas, 64% (raw material producers 67%, processors 58%) had already restored their production bases; 26% (raw material producers 20%, processors 38%) estimated that they would be restored by the middle of July; and 3% estimated that restoration would require from six months to less than one year.

Regarding the reasons for difficulty in obtaining raw materials and parts/components (multiple answers), 88% of companies of the raw materials-producing industries cited “damage to the suppliers we procure from” and 42% cited “damage to the suppliers supplying the companies we procure from,” while 82% and 91% respectively of the companies of the processing industries cited these reasons. These indicate that the processing industries were being strongly impacted from two levels up the supply chain.

METI also conducted the “Second emergency survey on the actual status of industries after the GEJE” during June 14 - July 1, surveying 123 major enterprises (65 manufacturing, 58 retailing and
service). This represents a period of around three and a half months after the GEJE. In this survey, out of 91 production bases of manufacturing companies that received direct damage from the earthquake or the tsunami or both, 93% had already been restored by this time (whereas in the April survey, 90% thought they would be restored by summer), indicating that recovery had been quicker than expected. Regarding production levels, 80% had regained or surpassed pre-earthquake levels.

Looking at the procurement of raw materials and parts/components, the second survey found that compared to the April survey, the proportion of the companies of materials industries responding that there were no alternate suppliers fell from 12% (in the first survey) to zero, while these figures fell from 48% to 18% for companies of processing industries. The processing industries, which have a longer supply chain upstream, were indeed more strongly affected by indirect damage from the GEJE, but their recovery had made progress during the intervening three months.

Based on the published information by individual companies of the manufacturing industries, they seemed to recover, in general, more quickly than they had expected just after the earthquake. A reason for this seems to be that the original forecasts strove for certainty and therefore made slightly longer predictions, but many assume that Japanese companies’ “ability of production-field” achieved early recovery. This ability would include the dedicated recovery efforts of company’s staff in the field and contractors working around the clock, with their practical knowledge/skill and their sense of responsibility.

4. BUSINESS CONTINUITY MEASURES USEFUL FOR LARGE EARTHQUAKES

(1) Diffusion status of BCPs in Japan

According to the “Survey on the Actual Situation of Companies in Business Continuity” by the Cabinet Office, the diffusion ratio of BCP of Japanese companies has risen in recent years. In FY2011, 45.8% of large-sized companies completed formulating BCPs, compared to 27.6% in FY2009. The GEJE is considered a factor in the increase from FY2009.

As for medium-sized companies, the diffusion ratio in FY2011 was still 20.8%. However, it deserves attention that the ratio of “companies which do not know BCP” decreased rapidly from 45.3% (FY2009) to 15.1%. It seems that even medium-sized enterprises had to pay attention to the BCP in response to the surge of social interest after the GEJE.

(2) Factors in realizing business continuity at the time of earthquake

a) Securing earthquake resistance of buildings and facilities

Against the GEJE, earthquake-resistant design and anti-seismic reinforcement of buildings and structures, and base isolation and earthquake-resistant mounting of facilities were surely important factors for realizing business continuity. One of the reasons that the damage to buildings and structures by the GEJE seemed to be fewer than that by former large earthquakes would be these quake-resistance measures, in addition to the characteristic of the main earthquake that it contained few motions whose period caused serious damage to buildings.

b) Securing infrastructure and essential utilities

For business activities, infrastructure such as roads, ports and airports, and utilities such as electricity, telecommunications, water and gas are essential. With the GEJE, it may be said that highways and “Shinkansen” showed the effectiveness of earthquake-resistant works. While the damage to ports was extensive in general, the advantage of earthquake-resistant quays was confirmed.

As for the utilities such as electricity, telecommunications, water supply and sewage, the nation-wide recovery support system was realized from an early stage and worked well, in addition to the
effect of introducing earthquake-resistant technology in advance. Still, the situation showed that recovery works of utilities did not make the desired progress, because the affected area was so vast, restoration of roads took time, and tsunami warnings continued because of aftershocks in the coastal area. A research result by the Earthquake Engineering Committee of the Japan Society of Civil Engineers9 showed that recovery of electricity and so on took more time than with the Great Hanshin-Awaji Earthquake.

c) Preparations for bases, persons and suppliers using the substitute strategy

Considering the serious damage to human resources, buildings and facilities, transportation, utilities, distribution, supply chains and so on by the GEJE, it seems very difficult for companies and organizations to get all of the necessary resources for their important activities by the same way as ordinary times when they are in an area that suffered severe damage from huge disasters. Therefore, a “substitute strategy” to secure alternative resources, which is a basic strategy of BCM, should be useful in general.

A substitute strategy, on the aspect of the business base, means having an alternate base(s) when a base used in ordinary times is not usable (See chapter 5 for details.)

On the aspect of personnel, a substitution strategy means securing persons who can act as alternates for a president and key persons; not a few organizations lost their top executives or key persons in the GEJE. The mayor of Otsuchi town of Iwate prefecture was killed by the tsunami. Besides that, many cases were reported in which a president of a company was far from his head office at the occurrence of the GEJE. To prepare for these occasions, clarification of a deputy and delegation of authority are effective for business continuity.

On the aspect of goods and materials, a substitute strategy means securing alternate suppliers to prepare for the stoppage of supply of such resources as raw materials and parts.

d) Substitute strategy and on-the-spot recovery strategy

A substitute strategy is necessary when the organization has suffered severe damage. Generally speaking, the earthquake resistance of many buildings and facilities was effective against the GEJE, as mentioned above. These cases were frequent in areas where the tsunami did not strike hard and which were distant from the seismic center. Strengthening buildings and facilities against earthquakes and other disasters belongs to the "on-the-spot recovery strategy," in contrast to the substitute strategy in BCM.

That is to say, organizations need a substitute strategy to prepare for the case when their bases in the ordinary times are not usable. The organizations also need an on-the-spot recovery strategy to prepare for the case when the damage to their usual bases is not severe. The probability of encountering the latter case must be much higher, but when organizations are unable to achieve early restoration on the spot at their usual base, their business continuity would become extremely difficult without a substitute strategy.

In addition, companies and organizations should be aware that building an alternate base in full scale entails great cost, and it may be difficult to keep efficiency and profitability equal to a single base production at ordinal times. Therefore, it is recommended to take earthquake proofing measures at any rate so as to increase the probability of recovery on the spot and to lower the possibility that they must implement the substitute strategy.

(3) Substitute strategy to avoid unexpected situation

Many organizations faced “unexpected” situations in which the real damage from the GEJE was far greater than estimated. To avoid these problems to some extent, it is recommended to think of the damage from the view of “outcome events” (resultant situations), such as “inability to use the important usual bases,” “absence of key personnel,” “the impossibility of procuring raw materials or parts.” By this, organizations are able to have an idea of how to deal with similar resultant situations in the common ways even if they were generated from different causes. For example, the resultant situation is that the usual base is not useful, and causes are tsunami, earthquake motion, fire, stoppage of electricity supply for a long time and so on. If the organization had prepared a substitute base, it should be effective even when the damage to the usual base by any of these causes is beyond what was predicted. Furthermore, this way of thinking leads people to realize the effectiveness of an alternate strategy.

5. VARIOUS METHODS TO SECURE ALTERNATE BASES

(1) Means to secure alternate bases

While alternate bases are effective in a time of disaster as mentioned above, it is not easy for a company or an organization which usually has finance restrictions to prepare an alternate base on the same level of facilities and functions as the bases used in ordinary times. Unless a company finds itself in a situation where sales are growing and it is able to invest in strengthening its production capacity, it will be difficult to prepare another production base. However, alternate bases can still be effective even without the facilities and functions that are equal to a
base used in ordinary times.

The examples below are methods that have been found from past experiences with disasters, and they also showed their usefulness in the GEJE.

a) **Alternate communication bases**

The first method is that a company designates an “alternate communications base” in some location where it can communicate with employees and important business contacts. Perhaps it is even useful to use the president’s home. The location of the alternate communication base should be one where the same hazard will not cause damage simultaneously as to the original base. The company should provide place and contact information to business partners and other important parties. The base may be used as a place to keep backup files of important information, blueprints and other documentation.

When the usual base becomes unavailable, the alternate communication base would be the company’s site to confirm the safety of employees and open communications with important contacts, while the organization would start searching for alternate bases to be used for overall business activities. This method focuses on the importance of communicating with business partners just after a disaster. This would be effective for construction companies engaged in recovery activity just after a disaster. Even when its head office is not usable, a construction company may operate on a recovery work site if it can secure its workforce and subcontractors.

In the “Approval System of Constructors’ Business Continuity Ability at the Time of the Disaster” that the Kanto Regional Development Bureau has carried out since 2009, it is essential to prepare for an alternate communication base and get ready for liaison and coordination from there.

b) **Planning of an alternate base and exercises**

The second method is that a company with one production base decides clearly on a location for an alternate production base, deliberately plans how to set up facilities in the base, and carries out exercises for setting up the base many times. This seems to be useful for a manufacturing base using very expensive facilities, and therefore the cost of preparing second bases would be very high. Their profitability would be not enough if they had to produce in two bases.

The successful example of Fujitsu Group during the GEJE has been published. A factory of a group company in Fukushima prefecture which was producing desktop PCs suffered and was unable to operate. The group set the alternate strategy in operation quickly: another group company in Shimane prefecture which was producing desktop PCs served and was unable to operate. The group set the alternate production base, deliberately plans how to prepare for an alternate communication base and get ready for liaison and coordination from there.

The examples below are methods that have been found from past experiences with disasters, and they also showed their usefulness in the GEJE.

**c) Cooperation with a company in the same industry in a distant place**

The third method is cooperation with companies of the same industry in distant places where a disaster will not strike both companies simultaneously. One of the typical shapes is to conclude a “mutual cooperation agreement in a time of disaster” and to help each other as a sort of an alternate base.

An image of this is shown in **Fig.5**. When early recovery of own business base is unavailable, this method makes it possible for a company to utilize its technology and knowhow in association with the other company, maintain its relations with important customers, and even keep some of its workers employed.

An actual case is when the companies of Electroplating Association of Kanagawa prefecture and Niigata prefecture signed a mutual cooperation agreement for alternate production in April 2011. As it is essential that the two parties have strong mutual trust, there are regretfully few practical examples of this approach until now. If two counterpart companies with the arrangement were mutually profitable in some cooperative business in ordinary times, such an arrangement would be more widely adopted. Efforts to seek a mediating role for government or economic organizations could be expected.

In addition, a similar approach can be found in real examples responding to the GEJE. A company in the waste industry that performed treatment of waste from hospitals and sludge from water and sewage plants suffered serious damage to its processing plants from the tsunami. While the company was expected to start operations to fulfill these social needs in several days, the recovery of their plants needed a few months. However, it was able to secure processing ability by asking processing work of a
business partner in another prefecture. It was awarded by the Business Continuity Advancement Organization, a non-profit organization acting for the diffusion of BCM.

Furthermore, one more similar example is that of another awarded company that treats waste oil. It requested alternate processing from a business partner in another prefecture from which it had ordered part of its processing in ordinary times for the purpose of having an alternate base in emergencies.

(2) Location of alternate bases

In a widespread disaster, even though a BCP has designated alternate base(s), there would be many examples of both the usual base and the alternate base(s) being simultaneously struck. In the GEJE, there were companies whose usual and alternate bases concurrently sustained damage from the tsunami, while others got simultaneous damage from shortages of electricity. Thus it is also very important to review the location of alternate bases.

However, the location of an alternate base is not always “the farther, the better.” It is often easier to maintain business continuity in an alternate base by having key personnel move from the usual base. Therefore, preparing an alternate base within walking distance is one useful approach if the transfer by cars or public transportation is expected to be difficult, as in the aftermath of an earthquake in a large city. This arrangement, however, would raise the concern that the alternate base would sustain damage at the same time as the usual base, so it would appear desirable to provide for both a nearby alternate base and another one considerably farther away.

Additionally, in metropolitan areas, the special need of having plural alternate bases was found when considering the situation of Tokyo just after the GEJE. Though there was little physical damage, public transportation was not available. When the Tokyo Inland Earthquakes occurred, there were additional problems such as fire along the streets, damage to bridges and falling objects from buildings. Therefore, it would be hard to think of movement other than a short walk in the center of Tokyo just after the earthquake. Therefore, if a big earthquake occurred during working hours, an organization would need an alternate base not so far from its usual headquarters located downtown. Making the move to a suburban alternate base would be very difficult.

On the other hand, when a disaster occurs at night or on holidays, it would be difficult for most of the personnel living in the suburbs to gather quickly at the usual headquarters or an alternate base located downtown, if workers living near the city center are limited.

It can thus be effective for such an organization to have an alternate base for nights and holidays in the suburbs, where many workers live in and are able to come together easily. Some companies have decided to hold their dormitory in the suburbs as one of their alternate bases in the occurrence of disasters at night and on holidays.

However, many companies will not have the leeway to prepare multiple alternate bases with the same level of facilities and equipment. In that case, it can be effective to designate the locations, without extensive investment in facilities and equipment, and to inform employees and business counterparts about the location clearly. The effect will be shortening the time to decide on and relaying the place of the alternate bases in a time of disaster.

6. SUPPLY CHAIN PROBLEMS IN BCM

(1) Disruption of supply and companies’ response

Even before the GEJE, Japanese organizations seemed to be aware to some degree that if a major earthquake should occur, they would confront the problem of disruption of procurement from their suppliers which were affected, based on their recognition of supply chain management and the BCM. At the same time, however, they probably found themselves faced with the fact that it was very difficult to adopt any radical approaches to prevent the disruption of supply, since cost and labor factors come into play.

Then they faced the massive damage caused by the GEJE. Japanese industries and enterprises have made an all-out effort to attain early recovery, as an after-the-fact response. Most of the companies whose facilities and installations were damaged seemed to have set out restoration works as soon as possible, so long as the damage was within a range where recovery was somehow possible on site.

On the other hand, when organizations found it difficult to recover the usual business bases for the time being, most of them began considering getting new bases, if they did not have plans to secure substitution bases.

Meanwhile, there were also many enterprises which were not struck directly but faced the disruption of supply of essential parts or components. Their response seemed to be these three general approaches: (A) assisting their damaged suppliers to recover; (B) acquiring alternate sources of procurement for the unobtainable parts and components; and (C) redrawing specifications so that the unobtainable parts and components need not be used. From these, the companies would choose one or several options that would solve the problems earliest.

Approach (A) was the most basic, and it would be
undertake these continuously and effectively. However, it is not useful when early recovery was not expected, such as in the area struck by the tsunami. Approach (B) should be difficult when the needed parts or components had been specially ordered to a single supplier. As for (C), it was said that, during normal operations, objections to changing specifications were common from the production floor, but when faced by a sudden disruption of supply, the production floor and customers alike became more amenable to such changes.

(2) Grasp of supply chain

Among the companies that struggled with the disruption of their supply of parts or materials after the GEJE, there were probably many who had not sufficiently grasped the location of producers higher up on their supply chain. Such companies likely had no way to foresee the damage they would suffer, and they probably regretted their lack of research. Especially, some companies might have multiple suppliers only to find that they were relying on the same supplier two or three levels up the chain. This type is called “diamond-shaped” supply chain. In comparison with this, more common is inverted pyramid style of supply chain, which it branches off into large number of suppliers upstream.

However, the problem of a diamond-shaped supply network is not a new one; it also appeared following the 1999 Chi-Chi Earthquake in Taiwan, when semiconductor plants were damaged. Though a finished product maker procured from multiple semiconductor suppliers, they all consigned their production to Taiwanese companies that suffered from the earthquake, and faced disruption of supply simultaneously. This has been cited frequently as an example of the need for supply chain management andBCM.

No doubt in the future Japanese enterprises will make greater efforts to know about suppliers two or more levels upstream on the supply chain. There are not a few examples of strengthening investigation to suppliers. However, the efforts will need not only considerable cost and labor, but also the cooperation of their suppliers to offer exact information about others even further up the chain. It will not be easy to undertake these continuously and effectively.

(3) Learning from the earthquake and improving the supply chain

In June 2011, METI’s Industrial Competitiveness Subcommittee of the Industrial Structure Council released a report entitled “Problems and Responses regarding Japan’s Industrial Competitiveness after the GEJE – Moving beyond a Crisis of Unprece-
have suppliers secure alternate supply bases, or strengthen their BCM if substitution is very difficult.

(b) For other parts and materials, introduce and thoroughly apply rules which emphasize the possibility of alternate procurement. Set forth the policy to settle the rule in the production field.

(c) Reconsider parts development performed only in cooperation with a single specific subcontractor, keeping in mind the risk of the stoppage of supply. From an early stage, discuss the methods such as expansion of the development members and securing a substitute production system, while considering the profit and patent rights of the subcontractor.

(d) When requesting subcontractors to secure their own alternate bases and strengthen their BCM, do not try to make the costs involved solely the burden of subcontractors; provide whatever support you can.

Improvement in supply chain management is necessary from the subcontracting companies’ standpoint as well. It is obvious that reinforcement of supply chains cannot be accomplished only by the efforts of finished product manufacturers. Subcontractors themselves have to consider how to survive when their supply chain is discontinued. I would like to point out the following four points:

(a) Be ready for a growing number of inquiries from customers to ensure their business continuity ability and request formulation of a BCP. Work on improving own BCM positively.

(b) Grasp the risk of the supply chain further upstream, and request procurement sources to make more efforts toward stable supplies.

(c) Subcontractors which have a larger market share seem to receive stronger requests to increase their business continuity ability and, on the other hand, have greater probability of receiving support from the customers for realizing it. Discuss support and mutual cooperation with customers deliberately.

(d) Consider strategies for survival by directing the supplies to other chains if the supply chain at ordinary times is disrupted at some point downstream.

Japan’s business sectors and government should be aware that foreign countries are apprehensive about the possibility of future large-scale earthquakes in Japan, and must show the status of countermeasures being undertaken to control the effects of supply chain disruption. Private business-support organizations would be expected to play a useful role in promoting BCM and supply chain management, in addition to governments.

7. PREPARING AN ENVIRONMENT FOR IMPROVEMENT OF BCM

In order to support effective BCM of private business and clear the anxiety of foreign countries regarding Japanese production and supply systems, the Japanese government should prepare a better environment as follows.

Firstly, the government should provide the supportive measures for supply chain management and BCM that METI pointed out (mentioned in 6, (3)).

Secondly, the government should expand items and coverage of the “estimation of damage from major disasters” that they will publish. At present central and local governments are proceeding with revision of their estimation of damage from large earthquakes and tsunami. Present estimations of damage do not include damage to mobile phones, mobile e-mail, the Internet, and other means of communication, as well as shortage of gasoline, light diesel oil and other fuels and electric power, restriction of distribution and lack of goods in the central part of metropolitan areas. These additional items in estimation of damage may be difficult to calculate even for the government, but companies and organizations need them in order to formulate effective BCPs, considering the lesson of the GEJE.

Thirdly, the government should clearly recognize the importance of the permission and authorization procedures that are necessary for business continuity of companies in times of disaster. To control dangerous materials, to secure hygiene and prevent fire, for example, there are considerably many procedures needing administrative confirmation prior to resumption of business operations. When governments select critical operations in formulating BCPs, these permissions and authorizations should be included for smooth recovery of economic activities. In addition, it would be useful for central and local governments to put together a package of preferential measures and easing of regulations for companies’ smooth business continuity.

In the first place, local authorities and public organizations should be more positive about holding a BCP and improving their BCM. Based on the author’s research by searching the websites in September 2012, out of 47 prefectures, only 17 prefectures have published their BCPs, in which large earthquakes are included as expected hazards.

As for existing BCPs of central and local governments, they seem insufficient in terms of securing alternate sites, range of the hazard to assume, conducting exercises and seeking continuous improvement. Recently, a director general-level meeting of central ministries and agencies coordinated by the Cabinet Office has discussed how to improve gov-
government BCPs, to prepare for the Tokyo Inland Earthquakes. They have already issued intermediate policies three times and they covered the insufficiency of the present BCPs. Early execution of these policies is desired.

If a local government does not have a BCP, there are concerns that BCPs of companies acting in the area are not evaluated properly by the government and it would be a restrictive factor in the diffusion of BCPs. Therefore public and private organizations should advance simultaneously to strengthen their business continuity ability.

8. CONCLUSION

The GEJE brought about great tsunami and widespread earthquake damage more than government existing damage estimation. A widespread lack of electric power and fuel occurred, which had not been considered before. Disruption in production caused by supply chain problems was seen for various goods. Concerns about Japanese disaster management ability in relation to production and supply systems spread in foreign countries. It is urgent that Japan, as an earthquake-prone country, show effective countermeasures utilizing the lesson of the GEJE.

It is necessary to enhance disaster reduction measures, including earthquake-proof works, as well as to spread the use of BCPs and a BCM that includes supply chain management. The GEJE showed the necessity of a “substitute strategy” in the BCP, in order to overcome situations when on-the-spot recovery is difficult. While it is not easy to provide an alternate base on the same equipment level as one’s usual base, there are some effective methods that can be adopted without much burden of cost and labor.

Government units are requested to prepare better environment for BCM of private sectors, in addition to improving their own BCPs.

The author expects that more proposals and countermeasures to overcome disruption of supply and stoppage of economic activities will be issued, based on new researches on disasters in future.

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