Business Continuity Management System That Supports Progress Management and Operational Planning

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***Abstract*— Japan is known as an "earthquake country" and hence both companies and governments require an operation management method called BCM to ensure that operations and services do not cease and allow business to continues, however, it's operation has not made any progess. In this research a system is proposed that incorporates a function for managing operational progress and a function for making operational plans based on a Gantt-chart in support of a BCM. A function of generating unexpected disaster events in particular is proposed, along with a function for enabling the best allocation of human resources. Traditional disaster manuals are made of paper, and hence when people need to examine them in referring to details on past disaster events it can take a lot of time.**

Keywords*— *BCM, Gantt-Chart, Disaster prevention,, unexpected event

I. INTRODUCTION

1.1 Background

As earthquakes have frequently occurred in Japan since early times it is often referred to as an "earthquake country". In the near future the "Tokai and TouNankai earthquakes" are expected to occur [1]. When earthquakes occur lifelines (electricity, gas etc) and the social infrastructure are disrupted and private companies have to cease doing business and providing services. This consequently is detrimental to them because of a loss of benefits and opportunities, and the dismissal of employees. Convenience stores continued doing business after the Great Hanshin-Awaji earthquake, thus alleviating social disorder, and revealing Business Continuity to be very important to both companies and society itself. A management method called "BCM" [2] has rapidly spread throughout Japan in recent years.

This research involves the propose of a system to support the creation of operational planning based on a Gantt-Chart [3] before a disaster occurs in reinforcing BCM as a "useful disaster manual", and in particular a function that can increase the scope of assumptions by generating unexpected disaster events that are not provided for in a Gantt-Chart, along with research on increasing the functionality of the system and creating new ideas and functions.

1.2 Actual conditions regarding BCM

BCM (Business Continuity Management) is a method of thinking that originated in Europe and the United States. It then gained global attention because of the attacks of Sept. 11 in 2001. The unexpected events taken into consideration in a BCM include earthquakes and terrorist attacks, thus allowing them to be promptly and adequately coped with, and ensuring business continuity [4].

Figure 1 reveals that companies innovating through BCMs can improve the expedition of their re-establishment and rundown of their capacity operating rate [5].

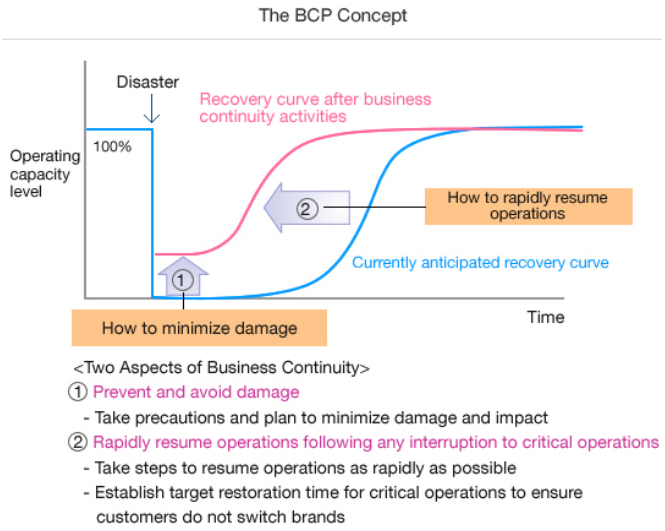

Fig. 1 The difference between introducing a BCM into business and not introducing one [5]

In Japan while the number of companies attempting to implement BCMs is increasing the number of companies

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formulating BCPs (Business Continuity Plans) and then instituting them is still less than 30% [6][7].

Research and development on supporting BCMs are currently advancing, but are still inadequate. An example of one such research study involves a system that supports deliberations being made on the analysis of documents and the timing of actions [8]. Another involves research on organizing informational communication technology with regard to BCMs.

The following figure gives the current status of the BCP plans of Japanese companies.

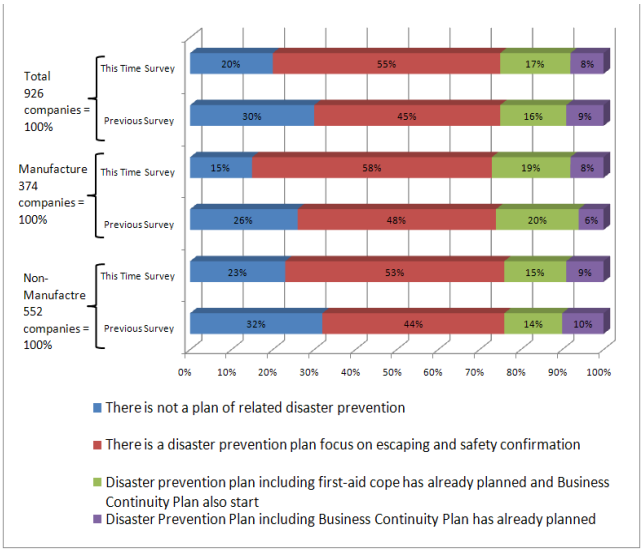

Fig. 2 BCP planning status of Japanese companies

1.3 Previous research

Research and development of BCM support is currently an attractive field and hence the amount of research on it is gradually increasing, although still cannot be said to be sufficient. Some examples of that research involves the computerization of disaster prevention manuals and support for analyzing the content of documents and examining necessary timing and arranging information and communication technology related to BCMs [9][10][11]. Research in this field still has many undeveloped parts to it, with a future possibility being ensuring it covers enough fields.

II. METHOD

2.1 The problems with existing BCM

BCMs in Japan include several problems, details on which are provided below.

I. Preparations for re-establishment lack detail and specifics, and are thus rather vague.

II. It is unclear how long manuals should have been examined before being created.

III. It is unclear how much time should have been set for each operation.

IV. Managerial events cannot be scheduled because of a lack of a general idea of the time needed in disaster manuals.

V. Disaster prevention training therefore cannot be made to conform to the manuals, and cannot be used to evaluate the manuals.

VI. Operational management cannot utilize disaster manuals during disasters.

The following points can be used to explain the causes of why the above problems occur.

I. Lack of experience on disasters when BCPs and the BCMs are implemented.

II. No books have been written on the aim of operating times etc.

Researching the above problems took a considerable amount of time, and therefore it will lack some details and specific content

2.2 Approach

In this research systems are proposed that involve a new approach to resolving problems and their causes. Tasks that people have to accomplish and their aims in complete operating schedules are basically expressed hierarchically in a Gantt-Chart, with a strong emphasis on timing. The functions of managerial staff are also created using the status of their qualifications. The systems aid in managing progress based on the start, progress and completion of operating reports from the scene, and regards requests for new tasks and the creation of schedules, and provides an environment that supports the allocation of staff. The system involves an electronic disaster prevention manual, and a system that aids in managing the progress of tasks. We in fact consider the system to have utilitarian functions in disasters as a “useful disaster prevention manual”.

2.3 Basic idea

All The main features of the system are outlined below.

I. Support for making a more detailed and concrete manual

The systems appeared capable of being used to describe the work that should be carried out when a disaster occurs as hierarchical tasks, and of being managed at various levels. A targeted time limit was set for each task to be completed based on the average approach used by a typical company.

It needs to be revised with that in mind through disaster prevention training to be more practical.

II. Creation of an electronic manual and real-time operational management utilizing a Gantt-Chart

The systems use a Gantt-Chart for planning tasks and managing progress. An attempt to pinpoint the necessary tasks and devise detailed sub-tasks was made through studying the stages of disasters, which parallels the creation of manuals. Coping with "restoration" as a whole company without being solely concerned with merely preventing a disaster is enabled in this operation, and overall can secure balanced "prevention" and "restoration" of business continuity.

III. Function of generating unexpected disaster events

Japan is in a frequent disaster stricken region, but actually has few people who have experienced disasters such as earthquakes,

IV. Review of manual after retrieval

When completed involves recovery from disasters, review of all manuals, identifying problem points, and connecting measures to use in future disasters. The system has a function that can register problems as a memo on the Gantt-Chart as a support measure. The results of review are made available to other companies using the system.

III. PROTOTYPE SYSTEM

3.1 System architecture

If the problems mentioned in the previous section were used in creating a system that functions in drawing up disaster actions, managing human resources, allowing information from several locations to be involved, and generating unexpected disaster events. Visual Basic and SQLserver on Windows were used as Visual Basic has a large library for use in event processing and is easy to adjust to Visual Basic. Figure 3 below provides the structure of the entire system.

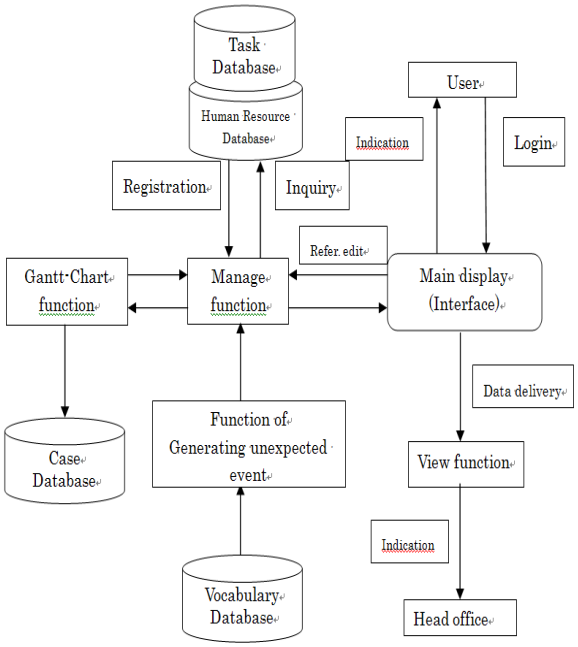

Fig. 3 Structure of the system

The systems is composed of the 4 main functions of a Gantt-Chart expression function, a Human resource/Task management function, the generation of an unexpected event function, and a View function on a 60 inch plasma display. The next figure (figure 4) reveals the input disaster condition data needed for the main function. Users need to input the "Scale of disaster", "Company conditions", and "Personnel data" as that data can then be utilized in future electronic manuals.

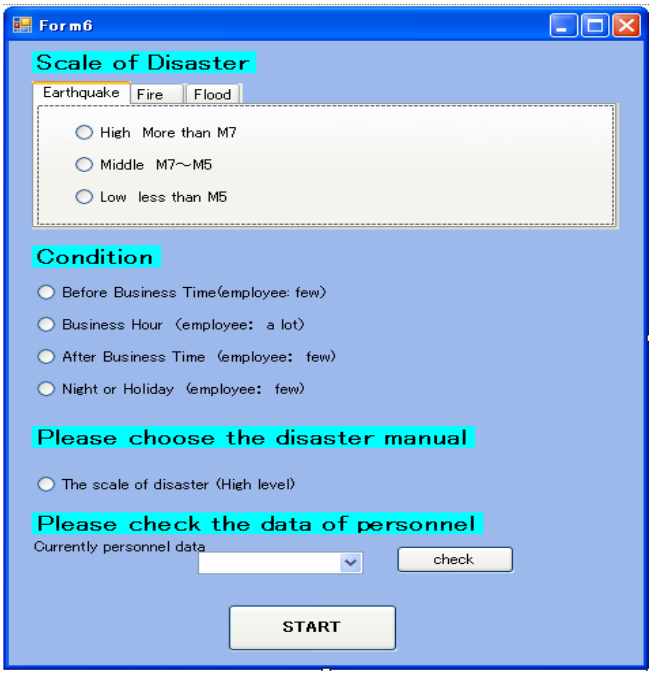

Fig. 4 Disaster conditions decision form

3.2 Function for generating unexpected disaster events

In the operational management a project that has accepted an assumed situation (scenario) is designed as a Gantt-Chart. However, there are also other factors that accompany unexpected events, thus making it necessary to slot unexpected events into the scenario as much as possible.

With regard to the optional tasks in the Gantt-Chart, therefore, the situation where operations cannot be executed can occur, and the measures used to cope with that are examined by the user and reflected in the Gantt-Chart. Figure 10 provides the main display of the function used to generate unexpected disaster events. Users first choose optional tasks. They can then push the "start" button" and an example unexpected event will be automatically expressed in the second blank space. User then finally need to input the measure used against the unexpected event. Any content a user has input is then registered in the database.

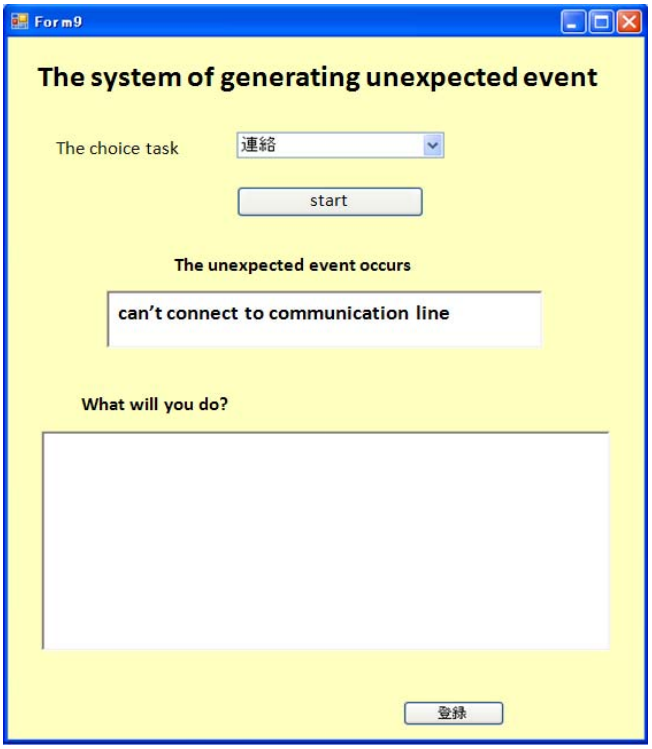

Fig. 10 Main display of function for generating unexpected disaster events

The system models expected problems, and includes a vocabulary database for unexpected events. In the problem model, for example, and concerning communication devices, it has several problem examples that include "can't connect to communication line", "no response from partner", or "too much noise". In the "contact head office by telephone" task a "person in charge of head office can't respond" error gets generated because the priority notion of a telephone is as a communication device.

Users can analyze and resolve measures, modify the Gantt-Chart, and register it as a memo. Figure 5 below depicts this.

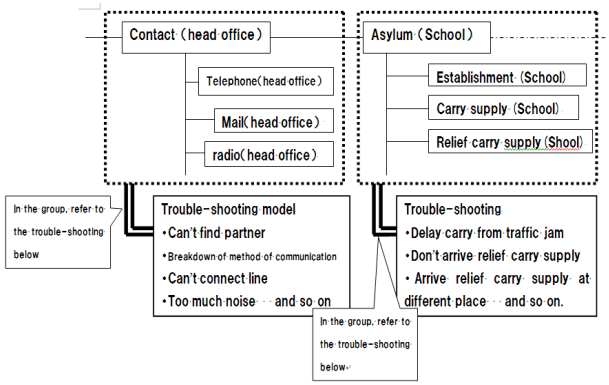

Fig. 11 Image of vocabulary database and trouble-shooting

The system also has a function that provides pop-up displays on coping with events through right-clicking the mouse (Fig. 12). There is a possibility that the same unexpected event can occur within the various tasks of the Gantt-Chart. For example, the task of "contact head office using telephone" could occur not only in the scenario of establishing a head office but also in the scenario of coping with an injured person. If there is a case the same as a past case in another task it can be referred to in the corresponding plan and in operating condition with the operation progress given by the Gantt-Chart and memorandum using this function. Full use of the corresponding plan can therefore be made when discussing tasks at that moment.

Fig.12 The example of pop-up expression

3.3 Disaster provision creation function

The onset conditions, target operation timing and department are set using a function that expresses the tasks which need to be carries out in a disaster in a hierarchical Gantt-Chart. This then makes viewing the task someone should carry out at a particular time easy.

Gantt-Charts provide information on which tasks are the most effective and those that are influence by delay for use in making incremental modifications revealed in training.

The system can also be used to execute operation progress management with a display, similar to as with the disaster provision creation function. Figure 5 below gives an example of this.

Consequently the task management function reveals the time assumed to be necessary with the Gantt-Chart, which has a hierarchical structure, and then sets that necessary time after

referring to an example from another company in the same business and industry.

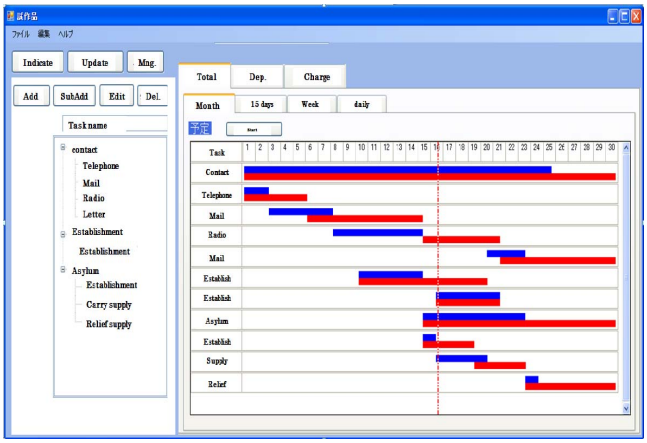

Fig. 5 Example of system display

In addition the systems also have a function that can display different time spreads. Or more concretely, if users wish to view a single month span schedule, they can merely push the "Month schedule" tab. Or in the case of a "week" users can push the "Week schedule". The following figure (Figure 6) gives a concrete example of this function.

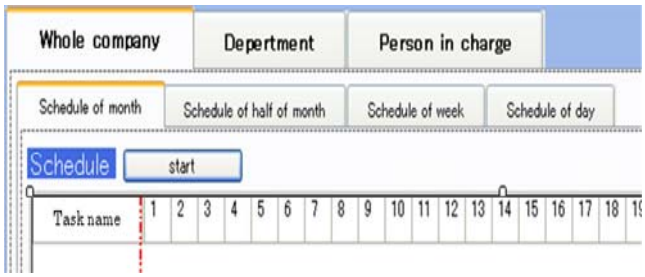

Fig. 6 Time spread selection display

3.4Human resource organization function

Disasters are often accompanied by unexpected events, and the human resources that organize operations for coping with unexpected events can also become an unexpected event themselves. This function was created as a support function. When registering a task the qualifications, sex, and work floor of the human resource can also be set. This is based on the conditions at the time of staff placement, and enables the staff to be posted to be selected.

In that regard the operational situation with human resources is "attendance", with the condition being that no operation has been arranged. The system calculates the necessary work hours after assigning human resources to tasks with the completion or deletion of tasks taken into account, and also has an established function which changes the condition to "rest" if the operational time is more than 7 hours. Figure 7 provides an example of the edit task display.

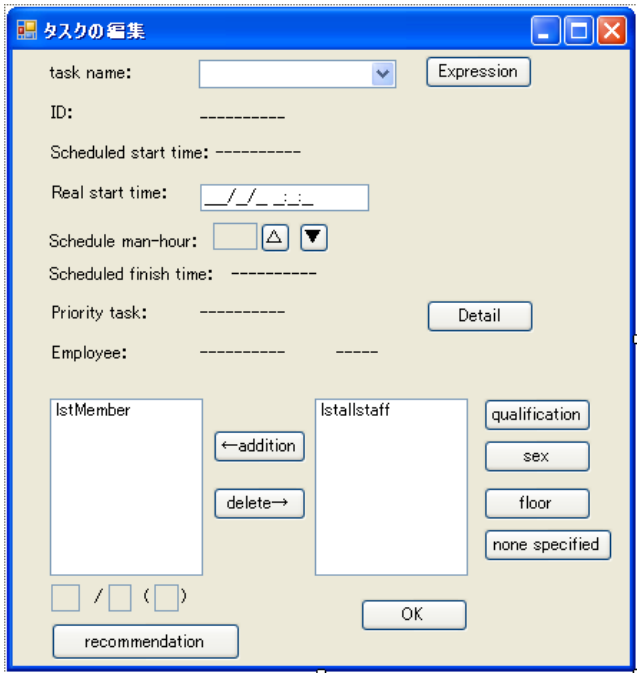

Fig. 7 Human resource organization function

"AHP" is used to select staff. When registering tasks with the function explained in the preceding section, the qualifications, sex, and workspaces of human resources are compared, and then finally the most suitable human resource selected based on the condition of the candidates.

Consequently the human resource management function can be used together with the optional levels of the Gantt-Chart, and then select a person to be in charge.
At the time of a disaster, and regarding late and newly occurring operations, sequential operations are not considered to be long- term, and support is provided for deciding the person in charge.

An example of the input display used to organize human resources with AHP is provided in Figure 8.

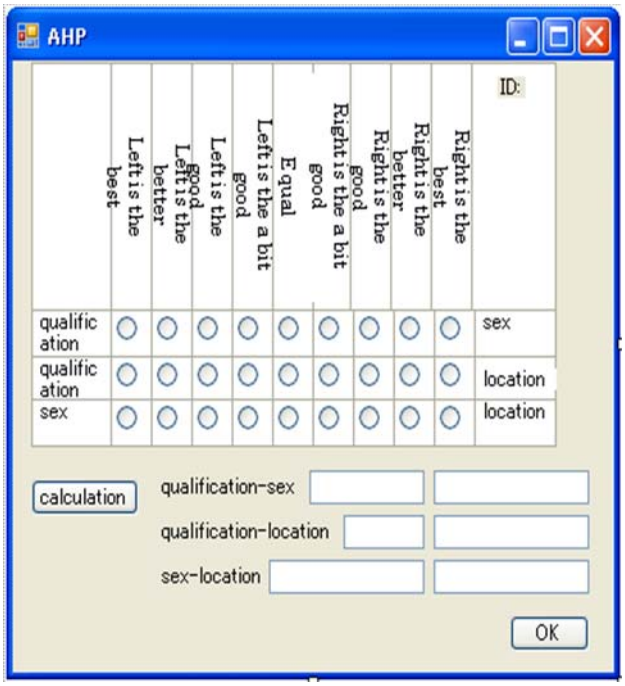

Fig. 8 Input display when organizing human resources with AHP

The next figure provides a list that is the information which compares between two sets of data when users utilize AHP. The value of an AHP item is determined with the following list. The system makes calculations using the list, and then organizes the human resources based on the result of those calculations.

mean	Pair Comparison Value
More important than front item absolutely	9
More important than front item extremely	7
More important than front item	5
Somewhat important than front item	3
Both item sare important equally	1
In case of seeing front item	Inverse of upper value

Fig. 9 AHP decision standards

3.5 View function

The system can verify the status with progress, with an operating display being shown at the disaster control head office on a large size display device. This function utilizes a network, and hence if the network is available it enables information to be shared not only with the various branches of a company but also other companies within the group.

Figure 13 provides a concrete example displayed on a 65 inch large size plasma screen.

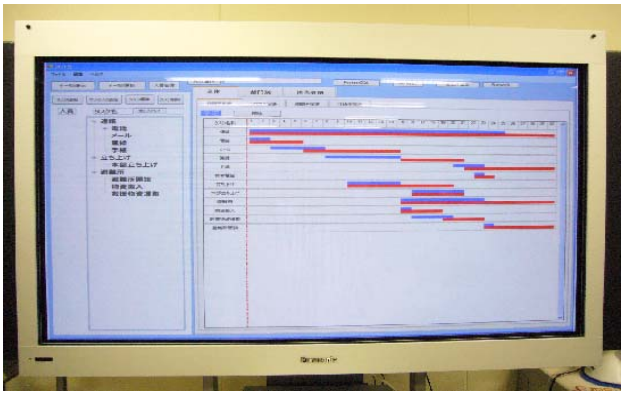

Fig. 13 Example of view function on large size display

IV. RESULTS

The systems mentioned in the foregoing chapter were evaluated by 2 presidents of software and insurance companies, with the following points being made:

- It proved effective at the time of a disaster.
- The system was easy to use.
- Realizes the functions necessary in disaster prevention

The BCM support system including the system created took three years to complete, so the goal was a shared vision, with the system at its present stage having been overviewed. We then identified what was useful and what was still inadequate, in addition to the kind of functions that need to be included in the future.

The functions of the Gantt-Chart and the function of generating unexpected events explained below.

4.1Evaluation regarding the function of generating unexpected events

Concerning the function of generating unexpected events the system was evaluated in a way that was very interesting and the functionality also effective, but the system as a whole has a lot of factors that need to be examined in support of the unexpected event function. Research needs to be done on improving it.

4.2 Evaluation regarding the function of the Gantt-Chart

Concerning the functions of the Gantt-Chart the system was evaluated to make it easier to understand what would need to be done. However, the assessment was also made that it needs to be improved in that it does not link the human resources function with the task management function, and adding a function that can input time directly would be better. Also indicated was that there are several insufficient points, and therefore we improved the functionality.

Ⅴ. CONCLUSIONS

In this research a system that supports business continuity in disasters was considered and a prototype system implemented that aims at helping to control the damage and how repair work can take place at the time of a disaster, such as an earthquake or fire.

The systems have 4 main functions that are used to create a disaster prevention manual as a hierarchical task expressed in a Gantt-Chart form, decide the person to be in charge based on the conditions, a progress management capability of tasks planned using the disaster prevention manual in the disaster, and generate unexpected disaster events. Above all is the function of generating unexpected disaster events in a disaster. A lot of unexpected events occur in real disasters, and therefore we identified a trouble-shooting model through training the system was used in, and now wish to utilize it in a practical system.

As a result of having received a needs assessment of the system a basically positive evaluation was received from 2 company managers, but with necessary refinements being pointed out. On the basis of their evaluations we intend to move forward with examinations of the refinements pointed out in future

REFERENCES

[1] Central disaster conference, Specialty examination meeting about Tokai, TouNankai great earthquake report, 2003. http://www.bousai.go.jp/chubou/9/haifu_2-2.pdf (2008/02/15 referred)

[2] Takehiko Yamamura: How to make a Business disaster and Risk management manual ～ looking BCP from disaster area. Kinzai, pp64-66, 2008.1.15

[3] Wikipedia "Gantt-Chart" http://en.wikipedia.org/wiki/Gantt_chart (2009/12/12)

[4] Seikiti Tanii: Practice manual; the measure of disaster recovery of computer system, Diamonds Company, pp3-30(2006)

[5] NEC http://images.google.com/imgres?imgurl=http://www.nec.co.jp/csr/en/report2009/continued/images/con_img01.jpg&imgrefurl=http://www.nec.co.jp/csr/en/report2009/continued/index.html&usg=__jz7V73RkGgWRWyrDR6UUhQ-LcmY=&h=435&w=540&sz=111&hl=en&start=67&um=1&itbs=1&tbnid=IX0iv6LZrhoOAM:&tbnh=106&tbnw=132&prev=/images%3Fq%3Dbusiness%2Bcontinuity%2Bmanagement%26ndsp%3D18%26hl%3Den%26sa%3DN%26start%3D54%26um%3D1(2009/12/4 referred)

[6] BCI Japan Alliance http://www.bcijapan.jp/article.htm (2009/12/4 referred)

[7] Accident insurance Japan: What is Business Continuity Management, http://www.sjrm.co.jp/bcm/about_bcm.html (2009/12/4 referred)

[8] Accident insurance Japan: SAFETY EYE, No34, pp4-5 (2008)

[9] Nobuya Kondou, Syunsuke Hamada, Kimirou Meguro: Supposing Next Generation Disaster Manual which can Provision for Disaster General, Thesis of 26th Earthquake Engineering Workshop, 1481-1484 (2001.8)

[10] Kimirou Meguro: From can't use manual to useful manual –Suppose to next generation manual has faculty, journal of civil engineering workshop 87, pp40-42 (2002.12)

[11] -Kaoru Tsuru: Consideration of regarding Supporting Business Continuity using IT technology: Report of Information Processing research, 2006-IS-95(6), pp.39-45(2006)