Design of Disaster Crisis Center Function based on Crisis Management Concept

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Abstract: Crises can be interpreted as a condition/situation that threatens and creates risks so that immediate handling/action needs by means of an emergency to prevent it from deteriorating. A situation can be a crisis in the event of a natural disaster that has the risk of causing casualties and a broad impact on the community, afflicting government business units, and very large financial losses. The way to deal with disasters in the crisis phase is to create a Crisis Center which is the center of management in managing information and coordinating disaster response centers. In a crisis situation, gathering information, making decisions, and directing appropriate actions requires good coordination. This research attempts to answer the problems by designing the functions of a Crisis Center related to crisis situations to support emergency response action plans based on the concept of crisis management so that decision-makers can determine the most optimal steps.

1 INTRODUCTION

Referring to a study conducted by the National Disaster Management Authority (NDMA), millions of Indonesians are in the threat of natural disasters. Based on the data, 86.2 million people were exposed to the risk of earthquake disasters, 3.7 million people were prone to tsunamis, and millions of other disasters (Mohd. Robi Amri, 2016). In the last decade, there have been seven tsunami disasters in Indonesia. Mentawai (2010), Papua (2011), Aceh and West Sumatra (2012), and Southeast Sulawesi, Banten and Lampung (2018) (Bencana, 2019). The impact of the tsunami was very large and caused many casualties and damage. This data illustrates that a tsunami disaster is one of the disasters that pose a serious threat to the risk of high casualties. The time span between tsunami early warning and the arrival of a tsunami until the status of a tsunami ends is a phase of crisis that must be managed optimally in an effort to deal with disaster emergencies.

A crisis or emergency is a threatening condition that requires immediate action. Effective emergency action can prevent events from getting worse (UNISDR, 2009)(Zamoum and Gorpe, 2018)(Al-Dahash et al., 2016). So the crisis can be interpreted as a condition/situation that threatens and raises risks so that it needs immediate handling/action by means

of an emergency so that it does not deteriorate. This phase begins when a disaster occurs until the end of the crisis period and the start of the disaster recovery phase(Khan et al., 2008). This stage greatly determines the impact of a disaster. If the crisis phase can be handled properly, it can minimize the loss of life and material losses due to the disaster. Therefore requires management that can manage a crisis situation from occurring due to natural disasters.

Crisis management means to deal with situations in which events that threaten the safety and security of the public will occur, or to manage it after happened (Abe et al., 2018). Crisis management is a proactive process that involves handling crises and specific actions taken to solve problems caused by crises (Carbery et al., 2014)(Devlin, 2006). So crisis management is a planned response to a crisis situation, which must be carried out effectively and on time when the crisis occurs. Crisis management also provides critical information needed for decision makers and plans that can be used to deal with crisis situations.

A situation is interpreted as a crisis in the event of a natural disaster which has the risk of causing casualties and widespread impact on the community, afflicting government business units at once, and very large financial losses. In this condition, the highest level of management in the area must lead the implementation directly. The highest management in question is

the district head of the affected area. After the district head receives news of a disaster emergency, the next step is to do a brief analysis, whether the emergency situation has reached a crisis situation. If it reaches a crisis situation, the district head must announce that the condition of the area is in a crisis situation. One of the facilities needed in carrying out crisis management is the Command Center (CC).

In general, CC can be interpreted as a location/place to provide orders, coordination, and decision-making in supporting emergency responses. The aim of CC is to collect and process the information needed to be able to manage various events and situational awareness quickly and effectively. The command center function is to provide central control points for the operations of the actors involved during the crisis so that they can give and obtain, every and all, available information about the status of the crisis (Devlin, 2006).

Indonesia, as one of the countries that helped ratify the Framework for Hyogo has also implemented disaster risk reduction efforts. Thus many government departments rely on their own special emergency response systems to conduct rescue operations, most contingency plans are designed from the perspective of their own sector. It is not surprising that these emergency plans usually have many disadvantages, such as inappropriate human resources allocation, poor information communication with external entities, and a narrow range in which resources are distributed. Once a large scale emergency occurs, such an emergency plan type cannot provide an adequate response. The way to deal with disasters in the crisis phase is to create a Crisis Center which is the center of management in managing information and coordinating disaster response centers. This research attempts to answer the problems by designing the functions of a Crisis Center related to crisis situations to support emergency response action plans based on the concept of crisis management, so that decision-makers can determine the most optimal steps. In a crisis situation, CC can turn into a crisis center. The focus of this research is on tsunami natural disasters with adequate early warning assumptions.

2 LITERATURE REVIEW

2.1 Crisis Management

(Bundy et al., 2017) identified two main perspectives that focused on various aspects of crisis and crisis management.

1. Internal perspective, focusing on organizational dynamics in managing risk, complexity, and technology. Crisis management involves the coordination of complex technical and relational systems and the design of organizational structures to prevent the occurrence, reduce impacts, and learn from crises.

2. External perspectives, focusing on the interaction of organizations and external stakeholders, mostly come from the theory of social perception and impression management. According to this perspective, crisis management involves the formation of perceptions and coordination with stakeholders to prevent, resolve, and develop a crisis. From this literature review, the internal perspective focuses on crisis leadership, while the external perspective focuses on stakeholder perceptions.

(Blyth, 2009) illustrate the focus areas involved in crisis events as follows: incident and crisis management teams, crisis control centers, evacuation coordination centers, emergency response teams, corporate front teams, incident management plans, and other crisis response plans. During emergency response operations, information management becomes very important. Emergency management stakeholders - as decision makers - require ongoing access to a variety of distributed data sources to plan, make the right decisions, and allocate resources for certain tasks.

2.2 Emergency Operation Center (EOC)

The Japanese government made its crisis management system model follow the Incident Command System (ICS) in Europe and the US disaster crisis management, seen from administrations that have important factors, namely: (1) organization, (2) information, (3) evacuation, (4) coordination, (5) reduction of incidents, and (6) reconstruction. Especially about disaster information includes what has happened and disaster management what must be done to reduce damage (Abe et al., 2018).

(Dave, 2015) put forward the definition of an emergency operations center is a physical facility equipped with technical infrastructure where decision makers meet to coordinate disaster emergency measures. Seven important functions (there may be more or less based on the disaster management agenda) occur in the EOC before, during, and after a disaster: coordination, policy making, operations management, information management, documentation, public information, and simulation. During emergency response operations, information management becomes

very important. Emergency management stakeholders - as decision makers - require access to a variety of distributed data sources to plan, make the right decisions, and allocate resources for certain tasks (Asimakopoulou and Bessis, 2011)(Perry, 1995).

3 RESULTS AND DISCUSSION

3.1 Crisis Information and Response Timeline

Information Tsunami disaster begins with tsunami early warning issued by Meteorological, Climatological, and Geophysical Agency (BMKG) as the authorized institution. This institution delivers earthquake information, tsunami early warning information, and suggestions for follow-up in tsunami-threatened areas to other parties in the tsunami early warning communication chain. After receiving an emergency tsunami warning message, the next step is for regional heads to announce that in a crisis situation, and at this time is the beginning of the crisis phase. At this stage, the crisis center gives the command to disaster management units regarding steps that must be taken in order to deal with the disaster crisis. In the event of a disaster, the command is integrated at the crisis center. Figure 1 shows the time period of the tsunami disaster.
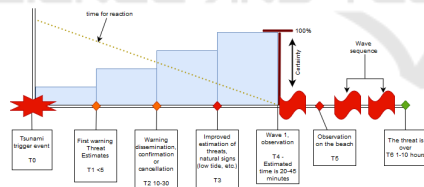

Figure 1: Estimated local tsunami time span (BMKG, 2012)

BMKG publishes news tsunami early warning within 5 minutes after the earthquake occurred, followed by a couple of times news updates news and ending the threat of a tsunami has ended. Tsunami early warning message contains the tsunami threat level for the district with the status of 'Awas', 'Siaga' and 'Waspada'.

3.2 Analysis Concept of the Crisis Center Functions

In disaster management, the readiness phase and response phase are part of the disaster management effort that is nuanced by emergency and often emotional nuances so that the crisis management function plays an important role. The proposed concept is a combination of characteristics of the functions of the EOC and crisis management. In chapter 2, a number of crisis center function concepts have been defined and identified in previous studies. Based on the existing concept, analysis of key functions is carried out, and then reformulated into a new concept. The process of forming the crisis center function concept can be seen in Figure 2.
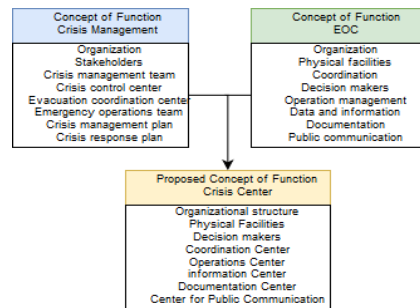

Figure 2: Concept of crisis center function

3.2.1 Organizational Structure

Design of the organizational structure of crisis center is divided into two stages, namely the stage of analysis and process.

a. Needs analysis design of organizational structure

The selection of organizational structure is intended so that the organization tasked with managing the crisis and disaster emergency response has a concise but reliable. It is necessary to ensure that the crisis center head is in charge of the implementation operational and disaster emergency response management, and does not have the authority to determine the emergency status of the disaster which is the authority of the highest leadership of the regional government, namely the district head.

b. Organizational Structure Design Process

In the following organizational structure design, the crisis center head is the command center and operations leader to provide more flexibility in terms of coordination. more details can be seen in the Figure 3

3.2.2 Physical Facilities

The crisis center is a physical location complete with the necessary infrastructure, where a leader together with a team conducts a meeting, makes a decision, assigns, coordinates, monitors and controls all actions needed in response to the crisis. These actions include
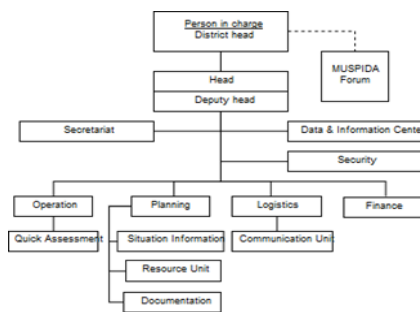
Figure 3: Crisis center organizational structure

emergency response actions, recovery and recovery plans, and steps to provide public information. In developing a crisis center, it needs to be considered: location, building and supporting facilities.

The chosen location must have natural disaster risks and security threats in low-level. Crisis center construction specifications issued under the disaster risk management program (DRM) recommend that crisis center spaces should be designed with reinforced concrete frames, for twice the seismic strength normally designed by residential buildings in each zone so that the crisis center building will have factors that much higher than security against possible earthquakes.

Space layout should allow the team to meet, communicate, work, and stay in the place within a few days. Communication systems, IT systems, power systems, security systems, complete with emergency support facilities are imperative in supporting facilities. Figure 4 contains features of supporting facilities from the crisis center.
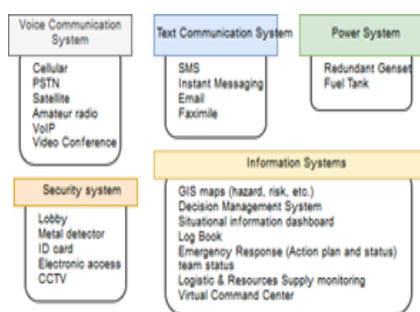

Figure 4: Features of supporting facilities

3.2.3   Decision Makers

Decisions and procedures are developed at the crisis center to anticipate disaster risk. A comprehensive emergency plan must determine decisions to respond to certain disaster events. However, most decisions can be generated by situational demands (eg

the amount, time or specific impact of the threat) and consequently not included in the existing plan. Such decisions usually represent managerial decisions and strategies taken by the crisis center leadership and then disseminated. Important points that must be considered when formulating a decision include: Identification of events; Identification of personnel led with overall responsibility; identification of key stakeholders; standard operating procedures for operating functions; emergency resource management system; existing infrastructure (Dave, 2015)(Perry, 1995).

3.2.4   Coordination Center

Crisis centers serve as coordination points for emergency activities that provide centralized meetings, planning, and reporting facilities. Coordination involves assessing the nature of the threat of a disaster and compiling the organizational resources available to act together with each other against the threat. Consequently, the crisis center is responsible for ensuring that the respondent organizations work together and know each other's mission, responsibilities, and areas of operation. The crisis center leadership uses a comprehensive emergency plan as a framework for achieving coordination. In this plan a cooperation agreement is made, assignment of tasks assigned to different organizations, the chain of command and enumeration of available resources. Coordination is therefore facilitated and established before a disaster occurs, and is codified in the plan. In this design, the crisis center leadership must creatively and spontaneously overcome the problems of implementation and mobilization at that time, but the coordination base is established in the planning process and strengthened through experience with disaster training or simulation.
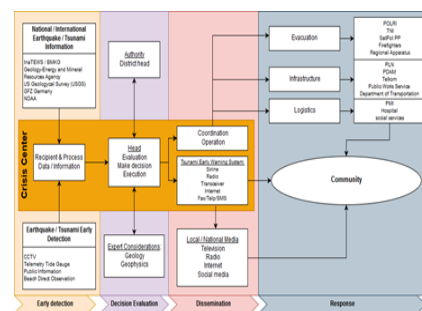

Figure 5: Crisis Center as a Coordination Center

3.3   Information Center

Information flows to the crisis center during a disaster. Data on the implementation of disaster response,

damage assessment, and recovery operations must be collected, analyzed, and distributed to the appropriate parties so that they can be followed up in an effective and timely manner. Information needs related to the impact of disasters, combined, form a crisis center function as an information center. Beyond the damage assessment, the crisis center requires information about the successful implementation of the overall disaster response. This includes information about the timing and effectiveness of operational decisions. The crisis center is also a clearinghouse for information; collect information about the activities and successes of various respondent institutions and submit this information to other respondent institutions with related tasks.

3.3.1 Documentation Center

Information collected on crisis center during a disaster is becoming critical in decision making, both during and after the emergency. In addition, the documentation of the emergency response during a disaster event allows for the evaluation in the future about what works and what doesn't work. This information is often used to define "lessons learned, " which can help the development of policies and procedures in the future.

3.3.2 Public Communication Centre

The crisis center is responsible for disseminating information to the public, at-risk communities, and the media. This will reduce the difficulties associated with incorrect information and ambiguity because the main source of response data is accurate, that is, from the crisis center. With regard to public information needs, two hearings are a major concern: the general public and the community are at risk in the disaster faced. Other important audiences who sometimes function as a buffer between the crisis center and other publics are mass media. Historically, it was also known that mass media would disseminate their own information if disaster managers failed to work together and provide information.

Thus, effective disaster management actually requires some consideration from the mass media. Establishing a function of disseminating information connected with crisis centers can resolve various difficulties that usually arise in disaster management. It is very important that the respondent organization in the field not be a source of independent contact with the media. By concentrating this function in a crisis center, and placing it under the supervision of a public information officer, someone ensures that consistent and accurate messages are disseminated, and

at the same time facilitates the media to obtain authorized information. The dissemination of accurate information to the wider community can also reduce the demands of the emergency response system by:

- ensure that outsiders know where the affected area is and how to avoid it, thereby reducing problems associated with convergence;
- ensure that outsiders know where affected friends and relatives are, reduce the need for information to call, visit or "save" these people.

Furthermore, Figure 5 shows the functions of information management and operations management in the crisis center.
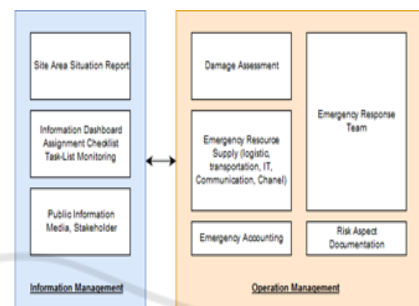

Figure 6: The function of information management and operations management in the crisis center

4 CONCLUSIONS

In this study, the design of the structure and function of the crisis center has been described. The crisis center description or model presented here is taken from the research literature review and related research data. This model can serve regional heads in at least three main ways. First, it provides a basis for comparison by offering standard structures and functions that can be compared with existing emergency response centers. Such comparisons are useful because they encourage oversight of the government's response system, the community, and it's needed. Second, this model can serve as a guide for the government in building a crisis center. This design provides structures and functions that might be included in the design of the new crisis center. Third, the model presented here can be the basis for discussion of how the crisis center can be designed with the concept of disaster crisis management. For further research on the function of disaster crisis centers can be done in two focuses. The first is how to implement the concept of the function that has been designed. The second is evaluating the concept of crisis management implemented.

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