Conference Paper

Descriptive Analysis of the Contingency Plan in Cilegon City, Indonesia

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Abstract

Cilegon City is highly vulnerable to not only industrial disasters but also natural disasters, such as volcanic eruptions, tsunamis and earthquakes, hereafter referred to as complex disasters. This is a descriptive study, which aims to show the contingency plan in place for these complex disasters in Cilegon City. The data is qualitative and was collected through interviews with key persons from the institutions responsible for complex disasters, such as the Planning Agency (BAPPEDA), the Disaster Management Agency (BPBD), the District Health Office (Dinkes) and the District Social Affairs Office (Dinsos) in the City of Cilegon. Information was also gathered from the Indonesian Red Cross (PMI) and the Search and Rescue Agency (Pos SAR), both in Cilegon City. BPBD was established in 2015 under City Law Number 5/2015 (Perda No 5/2015). BPBD acts as the disaster management coordinator in its administrative region, whereas the city secretary (known as SEKDA) acts as their incident commander. BPBD also acts as a link to the National Disaster Management Agency (BNPB). Although the city government has institutional arrangements for complex disasters, we observed some gaps in their contingency plan. The different agencies have different perceptions, and no general consensus exists on the priorities. For example, although assembly points for evacuations were determined, some of them can no longer be used. However, some district offices do not share this latest situation.

Keywords: industrial disaster, natural disaster, Cilegon city, contingency plan

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1. Introduction

Cilegon City is an industrial city located in Banten Province, West Java, Indonesia. Geographically, it is located near Sumatra and separated by the Sunda Strait, home of

Krakatoa. The location of Cilegon City is strategic for transporting industrial product between Java and Sumatra. The industrial areas in Cilegon City are mostly dominated by the chemical industry, which accounts for potential revenues of approximately 80 trillion Indonesian Rupiah annually. Consequently, it contributes to the central and provincial governments' incomes as well as those of the stakeholders involved, all of whom will be affected by poor industrial disaster management [1]. The industrial area in Cilegon City is divided into four zones: Zone 1 in the Ciwandan area; Zone 2 in Krakatoa Industrial Estate Cilegon (KIEC); Zone 3 in the Merak area; and Zona 4 in the Pulo Ampel area. The chemical industry is mainly located in Pulo Merak and the Grogol sub-district, Citangkil sub-district and the Ciwandan sub-district [2]. Thus, approximately 73,500 people in Zone 3 in Merak are potentially at risk of being exposed to a disaster.

Because of its nearness to Krakatoa, which had a massive eruption in 1883, Cilegon is also highly vulnerable to natural disasters. Based on the history of earthquakes and tsunamis in the Sunda Strait, massive earthquakes have occurred in the following years: 1780, 1860, 1903, 1923, 1963, 1999 and 2000. Tsunamis were reported on 22 January 1780, 9 January 1852, 21 December 1852, 22 July 1860 and 1883, due to the eruption of Krakatoa [3]. Earthquakes happened in the Province of Banten five times in 2012, four times in 2013 and once in 2014. Areas prone to earthquakes and tsunamis (see Figure 1) in Banten Province are Pandeglang City, Serang City, Lebak City, Cilegon City and Tangerang City. Cilegon City is at an altitude between 0 and 553 metres above sea level (asl). The highest area is in the northern part of the Pulomerak sub-district (Gunung Gede), while the lowest is in the western part which is a stretch of beach [3]. The earthquake-threatened population covers four sub-districts consisting of 22 villages with a total population of approximately 213,685 inhabitants. It is estimated that 36,325 people are in the high vulnerability tsunami-threatened zone with the expectation that tsunami waves are around seven meters in height [3].

Therefore, Cilegon City is not only highly vulnerable to natural disasters but also industrial disasters, here after referred to as complex disasters. The objective of this study is to show the contingency plan in place for these complex disasters, based on the vertical and horizontal coordination between central and local governments, and their collaboration with other agencies in Cilegon City.

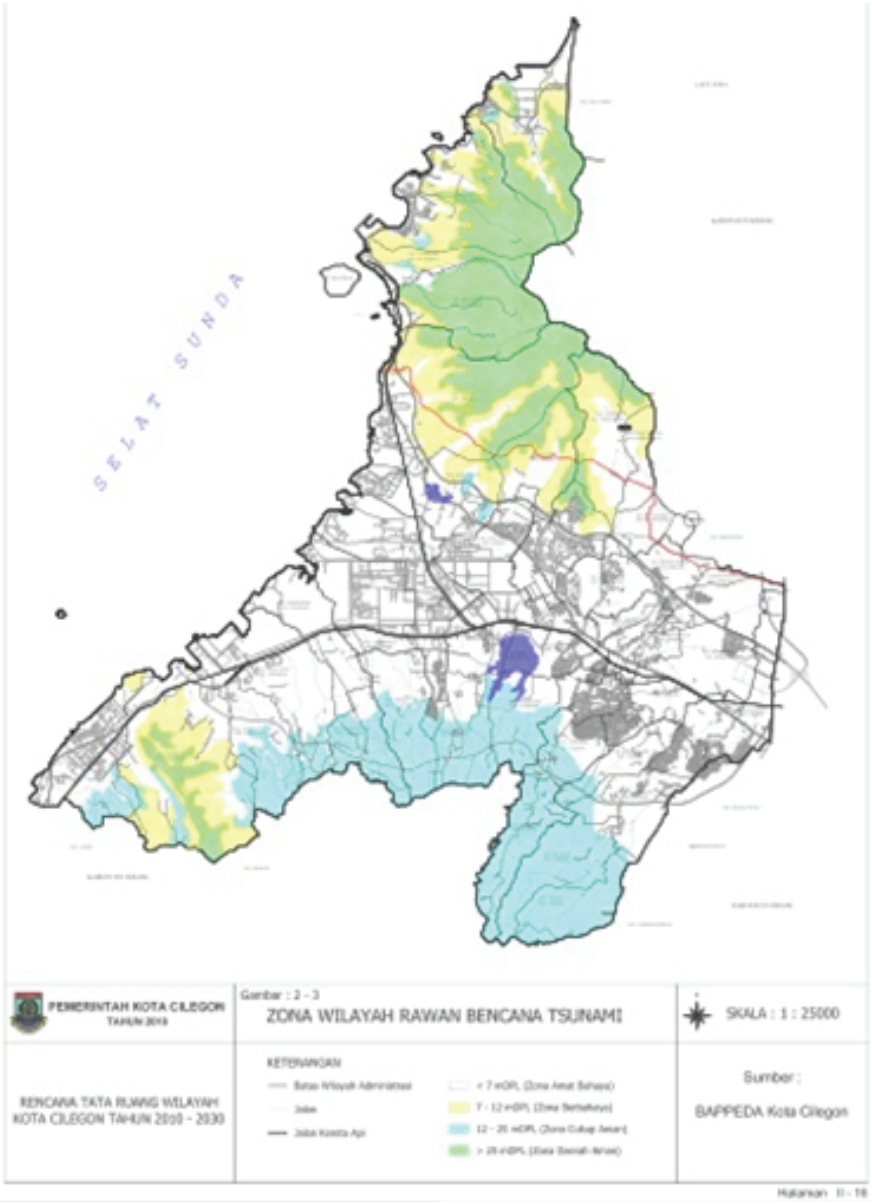

Figure 1: Zone of tsunami-prone areas. Source: Planning Agency (BAPPEDA), Cilegon City.

2. Methods

This is a collaborative pilot research study between the University of Indonesia and Tohoku University. The data is qualitative and was collected through interviews with key persons from the institutions responsible for complex disasters, such as the Planning Agency (BAPPEDA), the Disaster Management Agency (BPBD), the District Health Office (Dinkes) and the District Social Affairs Office (Dinsos) of Cilegon City. Information was also gathered from the Indonesian Red Cross (PMI) and the Search and Rescue Agency (Pos SAR) of Cilegon City. The data was collected in July and August 2017.

3. Results

3.1. The contingency plan in Cilegon city

BPBD was established in 2015 under City Law Number 5/2014 (Perda No 5/2014). BPBD acts as the disaster management coordinator in its administrative region, whereas the city secretary (known as SEKDA) acts as their incident commander. BPBD also acts as a link to the National Disaster Management Agency (BNPB). Cilegon City and BPBD do have a contingency plan in place for tsunamis and earthquakes.

The activities that have been implemented by the Cilegon City government to deal with disasters include the disaster mitigation plan concept for2010–2030, which involves the neighbourhood associations of Rukun Tetangga (RT) and Rukun Warga (RW) in Bahasa Indonesia. The government also plans to establish disaster evacuation sites [4] with a land altitude approach to accommodate RT and RW, install at least two siren systems for early warnings of tsunamis and industrial disasters [5], build an operating centre control room (crisis centre) and its supporting facilities, conduct simulations of natural disasters (earthquakes and tsunamis) [6] that will involve all levels of society, and carry out industrial crash drills in collaboration with existing industries.

The disaster mitigation plan concept for 2010–2030 with RT and RW includes maintaining the open green areas of the landscape, known as Ruang Terbuka Hijau (RTH) in Bahasa Indonesia, in order to protect the Suralaya power plant area. Additionally, the disaster mitigation plan aims to maintain the landscape of the large Merak Island, making it a protected area, particularly for Merak Port. A natural fortress of urban forest, spanning 5 kilometres in length and 100 metres in width, is being built as a wave retarder, which includes protecting the Krakatau Steel area (one of the largest state-owned steel companies). The mitigation plan minimises the impact [7] by changing the function of the space from an industrial area to a port, and keeps the RTH landscape as a barrier between chemical and non-chemical industries.

In addition, the government of Cilegon City arranges the creation of leaflets about natural disasters (earthquakes and tsunamis), industrial disasters and the necessary rescue steps, which are distributed to the community, all schools from the kindergarten level to high school, and all public and social facilities. Furthermore, the government also develops and maintains a database of disaster management's equipment and experts from each related agency and forming the BPBD of Cilegon City as the coordinator. There are also plans to hire some additional personnel, starting in 2018.[4]

The evacuation sites consist of 15 points that include temporary shelter points for approximately three points and the main post and three alternative points. For early warnings of tsunamis and industrial disasters, the development of two siren systems is planned at a total cost of 1.4 billion rupiah (National Budget Fund),and they will be controlled from the crisis centre (see Figure 2) in Cilegon City and integrated with the Cikarang–Bekasi tsunami control centre. The sirens will be located in the Grogol sub-district and the Ciwandan sub-district.

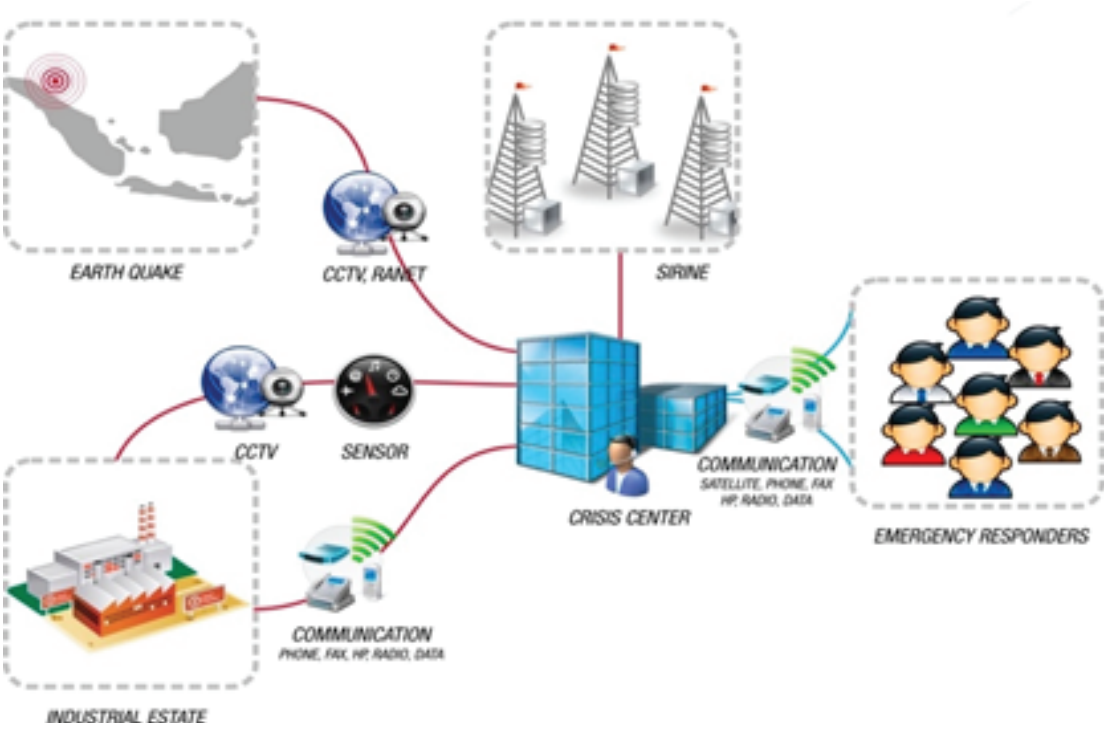

Figure 2: Communication design and monitoring. Source: Planning Agency (BAPPEDA), Cilegon City.

3.2. Simulations and drills conducted in Cilegon

The 2007 National Tsunami Drill was conducted with various organisations, which involved the army, industries, society, educational institutions and government agencies. Integrated industrial accident drills were also conducted with industries, along with hospitals and medical teams. Disaster leaflets were also created and distributed, which contained maps and locations of evacuation sites, industrial disaster evacuation tips and steps, earthquake disaster evacuation steps, both before, during and after the earthquake, information on tsunami processes, illustrations in the face of the tsunami, and a list of the companies that participated in the creation of those disaster-related leaflets.

A determination of events and the development of scenarios were both decided by agreement through hazard/risk assessments. In the scenarios, the predicted earthquake was followed by a tsunami at location 6.5 LS and 105.4 BT (around Panaitan Island) with a depth of 15 kilometres below the seafloor. With a magnitude of 7.5 on the Richter scale, the earthquake's epicentre was located near the Panaitan Island in the Sunda Strait (approximately 70 kilometres from Cilegon City). The tsunami wave height (run-up) was below 7 metres and occurred in the morning (08.00–08.30) when the activities of working people, schools and others usually begins.

In the scenarios, the tsunami waves were expected to reach the coastline of Cilegon City approximately 20 minutes after the earthquake and sweep most of the coastal plains, such as in the Ciwandan, Citangkil, Grogol and Pulo Merak districts. The distance of inundation on land would be about 0.5 to 2 km, depending on the topographic shape of the land itself. While on hilly topography, the level of inundation seemed to be less than the predicted distance, the damages to the infrastructure/buildings were considered to because by the earthquake shocks with a magnitude of 7.5 on the Richter scale. These were potentially catastrophic for factories, warehouses, storage tanks and the population who live in the coastal areas, as well as facilities and infrastructures, including public facilities. It was also important to notice that the small river areas scattered close to the coastline had the potential to incur damages because the tsunami waves would enter the river flow quickly. The sea water waves were expected to destroy the homes of people located along the river, all the facilities and also the existing infrastructures.

In addition, some drills were periodically conducted in industrial zones in 2012, 2013 and 2015, with a schema of disasters, such as earthquakes, showing their impact on oil tank explosions, fires and explosions in chemical facilities, and gas pipe leaks. The simulation was conducted with some district offices and representatives from the communities. However, these efforts were still coordinated by the industrial zone, and not by BPBD as the coordinator of disaster management in Cilegon City.

As a result of the interviews, the response phase should involve the Incident Commander and the coordination team, which includes BPBD who have coordination with Dinkes, Dinsos, PMI and Pos SAR. Dinkes will have significant role in providing medical supplies, health personnel and ambulances. Dinsos will provide the public kitchen since it has the required resources, vehicles, utensils, tents for refugee, etc. Pos SAR will conduct the search and evacuation of victims. Cilegon City's PMI will provide evacuation assistance and aid in the form of first aid as further aid will be provided through Dinkes. Dinkes will proactively give out aid when it is needed in coordination with the

Province Disaster Management Agency. The PMI has collaborated with the Japanese Red Cross to design a mitigation plan for flood disasters. BAPPEDA is the support system (including budgeting) for arranging the contingency plan by BPBD.

As for the implementation of the policies during the emergency phase of a disaster in relation to disaster-prone regional conditions, it is necessary to manage several strategies as each stakeholder establishes a rapid assessment team and reports to the sector coordinator. It is necessary to instruct all local organisational, institutional and community work units to mobilise all of their resources to be used in disaster management. It is also necessary to understand the sets of procedures to be followed before the earthquake and tsunami disasters. Furthermore, it is necessary to ensure that all victims will be given immediate assistance, with wounded victims receiving free medical treatment and displaced victims accommodated in evacuation places, while the deceased are buried immediately. If the intensity of the disaster is very large, it is necessary to coordinate with the provincial government, national and international institutions through standardised procedures. Gathering and distributing aid evenly should be the target.

Another concern is to divide job execution duties from related elements. Inventory all the losses/victims caused by the disaster. Prioritise the handling of victims among the elderly, children, pregnant women, the disabled, hospital patients, and those who are mentally and emotionally stressed. Provide basic services for victims and refugees. Provide refugee mobilisation, such as ambulances, medical/medicine, tents, public kitchen, food, clean water and sanitation. Provide an accountability report of the assigned task. Place/assign security forces to protect disaster victims both in the distribution of aid and in the evacuation. Finally, evaluate all of the activities that have been implemented and plan the follow-up strategies.

4. Discussion

The newly formed BPBD and its coordination among the involved stakeholders/agencies has not yet run smoothly. This is because before establishment, each district office devised its own plan to manage the disasters. BPBD has not been able to coordinate well with the other district offices because there are no existing regional regulations. BPBD still plans to do all the activities related to the disaster itself, such as applying for the purchase of rubber boats, tents, etc., whereas some of these should be covered by the other district offices.

Disaster victims (refugees), who do not have sufficient knowledge about the functions of each agency, only understand that they should get some help if disasters happen. This has also caused the BPBD to be responsible for providing direct assistance. Furthermore, it makes the victims and refugees compare the assistance provided by BPBD with the other agencies.

The existing mitigation plans cover industrial disasters. However, the industries themselves through the industrial zones already had mitigation plans for industrial disasters, but they did not coordinate with BPBD. Many types of simulations have been implemented, but they were not linked and coordinated. Spatial planning activities should pay attention to disaster mitigation aspects in an effort to avoid the harm they can cause [8] Space utilisation and control activities must also consider the mitigation aspects of earthquakes to ensure the implementation of sustainable spatial plans(9). Thus, spatial plans must incorporate disaster risk elements [10]. Furthermore, supervision of the implementation of technical building requirements [11], that is, earthquake-resistant building standards, especially for industrial buildings/public facilities, should be tightened, and security measures against disasters in other critical infrastructures, such as utility and installation systems (gas and chemical pipelines), should be improved. The socialisation of mitigation efforts can be improved through the dissemination of information to all parties [6] (public awareness), thereby improving communities ' disaster recovery capabilities and preparedness (emergency response).

Contingency plans have been prepared by some district offices and government and non-government institutions in relation to disaster management in Cilegon City on July 2010. After the preparation of the plans are completed, an overall Contingency Plan will be signed by the head of every institution who involved and confirmed by the Mayor of Cilegon as follow-up material. In the event of a disaster similar to the one assumed, this Contingency Plan will be activated as the Operational Plan, which will be carried out by the Head of the Regional Work Unit (SKPD). If the planned deadline cannot be met, the Contingency Plan will be extended for a further six months, in accordance with the results of a situation based on monitoring or changes in the conditions implemented by the SKPD appointed by the Mayor together with other related offices and institutions. The monitoring of the situation and condition changes is made every three months for updating data and information. Harmonisation of the Standard Operating Procedures (SOP) for emergencies followed by industrial companies with the local government is necessary to encourage acceleration of the BPBD of Cilegon City.

In order to help earthquake and tsunami disaster victims, it is necessary to implement some policies to ensure that all victims can be rescued, and various facilities and infrastructure can be improved [11]. Consequently, all activities of society will be able to run normally after a disaster has occurred. Some important policies that should be implemented include conducting rapid assessments of all sectors or the stakeholders involved, mobilising all available resources to be used in disaster management, and planning mitigation and earthquake disaster risk reduction [12]. This also includes ensuring that all surviving victims are rescued and those who have died are recovered immediately by determining the direction/steps/actions that need to be taken when analysing the impact of a disaster.

The coordination of disaster management activities, conducted by various government, private and non-government institutions, provides support and assistance to both local and foreign volunteers and donors [13]. These activities include assisting isolated shelters by mobilising the entire freight fleet, optimising the distribution of emergency aid, and arranging assistance both domestically and abroad in a transparent manner and according to the prevailing rules. In addition, regulations from the mayor are needed, ranging from the distribution of industrial zones to preparing facilities and infrastructures for disasters, monitoring and reporting losses incurred by disasters of both property and life, and maintaining the continuity of public services.

Regarding the response phase, to secure food stocks, medicines and aid for victims of natural disasters, the storerooms should be built at altitudes that are considered safe from tsunami threats. In the near future, a new rule will be implemented to build where provisions can be more secure and properly implemented with respect to Cilegon City. The spatial planning, building position, building location, earthquake-resistant building construction, and building floor need to be allocated in each sector.

Every disaster-affected community is not taxed. SKPD funds can first be utilised for the operational costs of disaster management in an emergency response. The need to improve preparedness in the future can be done by conducting certain activities, such as data collection and updating the list of disaster-prone areas every six months, conducting socialisation through information dissemination, and conducting disaster simulations while prioritising those areas and communities that are more disaster-prone. The crisis centre is developing and facilitating the information and communication, completing and repairing disaster equipment, and making contingency plans for other types of disasters that occur in Cilegon City, especially those due to technological failures. The local government will have to purchase land at designated evacuation

points using provincial budget funds or third-party funds, as well as improve and widen the evacuation routes and signage in disaster areas.

5. Conclusion

There is a contingency plan for tsunamis and earthquakes by Cilegon City and BPBD. Although the city government has institutional arrangements for complex disasters, we observed some gaps in their contingency plan. Different perceptions exist among the different agencies, and there is no common consensus on the priorities. BPBD should be the coordinator of the disaster management plan and gather all district offices to implement it.

The tsunami assembly points for evacuation were determined, but BPBD does not share the latest situation with other relevant sections in the city government. Cilegon City and its surroundings as the centre of the industrial area, and its potential revenue from industry contributing to the income of the central government, the province and other parties, will be negatively affected if disaster management is poorly prepared. This area will have greater investment value if good and comprehensive disaster management is in place, since disasters do not recognise administrative boundaries.

Cooperation between districts, cities and provinces in disaster management (communication system, SOP, drills, etc.) is necessary. A database of equipment and a list of the disaster management experts available in each regency, city and province should be compiled, with the data easily accessed by other areas if needed.

This study has limitations for generalizing its conclusion, because the authors implemented the pilot research. For the future research agenda, it can be considered that a comparison analysis seems to be significant. Comparison analysis enables us to explore roles of BPBD in each case, and to relatively understand similarities and difference. Serang Regency, locating next to Cilegon City, may be a suitable case. Serang City locates in Province Banten and the city has a lot of industrial facilities, as Cilegon City does. These two cities may have similarities and can be compared. Other industrial zones, such as the Jakarta port area and Cilacap Regency, can be studied.

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