The role of the fire safety management in providing a guarantee of a fire protection: The case of Graha Rektorat building of State University of Malang

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Abstract. The safety of building’s occupants is one of the most important things that should be considered in the design and construction process of a building. The provision of a reliable fire protection system could be the best way to provide a guarantee for fire safety. However, in a high-rise building, the evacuation process could be a problem when the occupants do not really understand about the evacuation procedure. Thus, a good fire safety management system is also needed to ensure that both the fire protection system and the evacuation procedure could run well when the accident happen. Through observation, documents review, and interview with the member of fire protection management as well as the building’s occupants, this paper intends to assess the fire safety management organisation and its role to support the fire safety protection system of the 9th-floor building of Graha Rektorat of the State University of Malang. The assessment conducted will be based on regulation of the Ministry of Public Works no. 29/PRT/2006 on the fire safety protection and evacuation. It was found that the organisation of the fire safety management of the Graha Rektorat building is need to be optimized to meet the requirement of the regulation of the Ministry of Public Works no. 29/PRT/2006 as to serve a better support for the fire safety protection system in that building.

1. Introduction
The fire protection system is one of the important factors in the building to serve a guarantee for fire safety. According to the regulation of the Ministry of Public Works no. 29/PRT/2006, the fire protection system is included in the set of safety requirement that should be provided in the building. In the time being, when the accident happened, people still rely the most on the firefighters while the readiness of the fire safety protection system in the building is sometimes still being neglected [1]. This statement is proven by the case of a fire accident in the Karya Building, the office of the Ministry of transportation on the 8th of July 2018. What happened in that accident is actually a small scale of a fire accident, but the smoke is already spread everywhere that caused the death of many people that mostly being founded in the emergency stairs [2]. This case tells us that good fire safety management is needed to support the performance of the fire safety protection system. The fire safety management will ensure that the fire protection system could run well when the accident happens, besides ensuring that the building users have adequate knowledge on what to do during the fire accident.

A research on the fire safety management had been conducted by Kristyanto (2012) [3] with the case of the 1st -4th floor of the Rectorate building of Brawijaya University. It was found that there are some weaknesses in the fire safety management system on the case study building including; the team that
put as the person in charge in the fire accident is the member of security, there are no evacuation maps that put on every floor of the building; not all of the building users are given a training in the management of fire safety [3]. Therefore, the finding of that research stated again the importance of the fire protection management system to support the reliability of the fire protection system.

The regulation of the Ministry of Public Works no 20/M/2009 [4] stated that there are three most important things in the management of fire safety protection which are; (1) the organization that include the fire safety manager, the personnel of communication, fire extinguisher, paramedic, engineer, floor warden, and security; (2) the operational governance which include the activities of developing the team planning, the development of building’s risk analysis in fire hazard, the development of a fire safety plan and the fire emergency plan; (3) human resources, this factor is very important to determine the effective and efficient result. Hence, the fire safety management should be supported with people who have background knowledge in the fire protection field including an expert in fire safety, paramedic, and management.

This research intends to assess the fire safety management in Graha Rektorat building of the State University of Malang as a high rise building that should be occupied with a good fire protection system that supports by a good fire safety management. The assessment will be conducted based on the criteria of fire safety management system mentioned in the regulation of the Ministry of Public Works no 20/PRT/M/2009 [4].

2. Research methods
This research is designed as qualitative research. The data collection is conducted by observation, interview, and document review. Observation serves to identify the fire safety protection system which is provided in the Graha Rektorat building of the State University of Malang. Interview with the member of fire safety management and the building’s occupants serve to get the detail information on the role of fire safety management in the case study building. Documents review serves to gain secondary information and standard operating procedure related to the fire safety management of the Graha Rektorat building of the State University of Malang.

3. Research findings
Graha Rektorat building of the State University of Malang is a high rise building consisting of nine-floor and a basement with a total area of 16.37 m² built in the 18.000 m² of site area. Since the regulation of the Ministry of Public Works, no 20/PRT/M/2009 stated that a building with the minimum area of 5000 m² or consist of a minimum eight-floor height is required to provide a fire safety protection management, therefore Graha Rektorat building has to implement this policy. In order to implement that regulation mentioned, firstly Graha Rektorat should be equipped with a standardized fire safety protection system based on the National Standard of Indonesia with the support of a good the fire safety protection management as required by the regulation of the Ministry of Public Works, no 20/PRT/M/2009.

3.1. Fire safety protection system of Graha Rektorat building
Based on the requirement of the regulation of the Ministry of Public Works, no 20/PRT/M/2009 the fire safety management system provided in the Graha Rektorat building of State University of Malang could be categorized as the fire safety protection infrastructure and the fire safety protection facilities.

3.1.1. Fire safety protection infrastructure. The infrastructure of fire safety protection provided in the Graha Rektorat building of the State University of Malang are including water resource, access for the fire engine and the evacuation route.
Water is taken from the PDAM and been collected in the ground water tank. The information getting from the interviewed is already confirmed that amount of water collected is considered to be enough for the purpose of fire safety protection when the accident happens.
The access for the fire engine is provided around the building of Graha Rektorat. Besides, this access, actually the National Standard of Indonesia number 03-1735-2000 [5] requires some other access including access for the firefighters to go inside the building, including the fire lift, fire safety stair, and shaft for the fire engine. Yet, Graha Rektorat building does not provide those access.

![Figure 1. Access for the fire engine](image1)

There are two emergency stairs provided, one emergency stair is located in the north zone, and the other is located in the south zone. The emergency stairs connect the ninth-floor until basement with the exit door located on the ground floor.

![Figure 2. Emergency stairs and exit](image2)

As the guideline and information for the building user, this building is also been occupied with the maps of evacuation route which located on every floor of the building. Moreover, a sign of an exit route has also been placed to complete the information.

### 3.1.2. Fire safety protection facilities

The fire safety protection facilities provided in Graha Rektorat building of the State University of Malang are including fire alarm, detection system, emergency communication system, fire extinguisher system. Actually, there is a facility of fire safety protection which are required by the regulation of the National Standard of Indonesia number 03-1735-2000 [5] but not provided in the building. This facility is smoke detector.

The fire extinguisher system available in the Graha Rektorat building of the State University of Malang is including the lightweight fire extinguisher, fire hydrant, and sprinkler system.

![Figure 3. Fire extinguisher](image3)
Fire hydrant system provided outside and inside the building. There are six outside fire hydrants which are placed around the building, four fire hydrants located in the semi-basement, and two fire hydrants in each floor.

![Fire hydrant](image1.png)

**Figure 4.** Fire hydrant

Glass bulb sprinkler which will explode when the temperature goes up until 57°C provided in each floor of the Graha Rektorat building of State University of Malang.

![Sprinkler](image2.png)

**Figure 5.** Sprinkler

Overall infrastructure and facilities of fire safety protection are already provided in a good condition as the required by the regulation of the Ministry of Public Works no 20/PRT/M/2009. However, those infrastructures and facilities cannot be functioned well without the support of a qualified fire safety management.

3.2. Fire safety management of Graha Rektorat building of the State university of Malang

This following review will discuss the condition and the role of the fire safety management of Graha Rektorat of the State University of Malang based on the regulation of Ministry of Public Works no 20/PRT/M/2009 [4].

3.2.1. Organization. The fire safety management team of Graha Rektorat Building of the State University of Malang is a part of the team of Occupational Health and Safety (OHS) which is formed based on SK Rector no 28.1.232.UN32/KP/2013 [6]. The organization and job descriptions of that team can be described as follow; (a) health and Accident Protection (HAP) is responsible in handling the work accident in terms of the campaign, prevention, curative, and rehabilitative, that occur in the scope of responsibility of the Occupational Health and Safety team of State University of Malang; (b) safety tool and maintenance (STM) is responsible in handling and maintain the tools related to the work scope of OHS so that the tools be ready whenever needed; (c) safety patrol and Education (SPE) is responsible for both direct and indirect monitoring of OHS activities and training; (d) data and Information Department (DID) has the responsibility in handling all of the data and information related to OHS of The State University of Malang

That organization of OHS team mentioned above is not only working for the Graha Rektorat building, but also being responsible as the standard planner of OHS in the entire complex building in The State University of Malang. As for the fire safety protection management in the Graha Rektorat, consists of; (a) evacuation coordinator; (b) fire safety protection coordinator; (c) occupational health safety coordinator; (d) emergency response officer, the person in charge are security in charge in each floor; (e) emergency response officer, the person in charge are the operator in the first-floor; (f) health care officer.
From the interview with one of the members of fire safety management team of State University of Malang, we got the information that the development of the fire safety management team is not based on the regulation of Ministry of Public Works no 20/PRT/M/2009 but based on the act year of 1970 on occupational safety. That is why the team that was being developed is the OHS team instead of the fire safety protection management. In the future, they expect to build the team of fire protection team for a building which consists of a fire engine, evacuation team, and safety team.

3.2.2. Operational governance. Some activities that already being conducted by the OHS team of the State University of Malang are including plan, standard, and analysis development, workshop and training on fire safety and evacuation, and simulation of evacuation in the Graha Rektorat building.

Plan, standard, and analysis that already developed by the OHS team of the State University of Malang are including analysis of the facility of fire safety protection system, the document of fire safety plan, the document of fire emergency plan. Besides, the team was also had already developed some operational procedure standard related to fire safety including the operational procedure standard for emergency evacuation, heat detector and sprinkler check list, hydrant check list, lift cleanliness and tidiness check list, cleanliness and tidiness of operator and panel room checklist, the fire extinguisher maintenance checklist.

As stated before, the OHS team of State University of Malang has already conducted some workshop and seminar on OHS, fire safety system, and evacuation procedure. Unfortunately, not all of the building user of the Graha Rektorat of State University of Malang are invited as the participant of that workshop. Hence, since all the security team are belonging to the team of emergency that being responsible to the evacuation process in the building, all of them are already participated on the workshop.

Another activity that had already being conducted by the OHS team is a simulation of the evacuation process in the Graha Rektorat building of the State University of Malang. This activity was held on 26th April of 2019 but unfortunately, this activity only involving the 1-4th floor since at the same time there is another important event that was held on the eighth-floor.

3.2.3. Human resource. From the interview, we got the information that the member of the OHS team of the State University of Malang is already involving some people with the background and experience on the fire safety protection and evacuation. Some expertise that involves in the OHS team is; (1) expertise in fire safety protection, expertise in emergency rescue, and expertise in the occupational health and safety management.

In the future, the OHS team of State University of Malang plan to (1) complete the facilities of fire safety protection system in the Graha Rektorat building; (2) develop the operational team of Occupational Health and Safety; (3) encouraging the certificate of building proper function of the Graha Rektorat building; (4) develop the team of building fire safety protection as required by the regulation of Ministry of Public Works no 20/PRT/M/2009.

4. Conclusion

This research found that the fire safety protection system that provided in Graha Rektorat building of the State University of Malang is quite sufficient as required by the regulation of the Ministry of Public Works no 20/PRT/M/2009. On the other hand, the fire safety system management is still needed to be optimized as it still does not meet the requirement of the Ministry of Public Works no 20/PRT/M/2009.

In order to meet the requirement of the regulation of the Ministry of Public Works no 20/PRT/M/2009, Graha Rektorat building of the State University of Malang should be equipped with the fire safety protection management that is dedicated for this building only, instead of just rely on the Occupational Health and Safety unit that works for the whole complex building of the state university of Malang.

Without the support good of fire safety protection management, it might be impossible that the fire safety protection system and the evacuation process can run well when the accident takes place.
Therefore, it is essential to optimize the function, organization and the operational governance of the fire safety management of Graha Rektorat building of the State University of Malang.

It is suggested that the training of fire safety protection and evacuation procedure also involves all of the building users as the participant so that when the accident happens, the building users know exactly what to do. Relying on all the evacuation process only to the security team that have no background knowledge on the fire safety protection and evacuation might be considered as too risky. It is also suggested that the simulation be conducted regularly involving not only the security from the first until the fourth floor but also involving all of the building users of the building. It is important to make sure that all of the building users be familiar with the evacuation process and do not feel panic when the accidents take place.

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