

Comparative Implementation of Fire Prevention Programs in Medan City High Schools

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ABSTRACT

Based on data from the Ministry of Education and Culture, 75% of the 355,270 schools in Indonesia are located in the highest impact disaster risk areas. This shows that nationally, schools have not fully developed into safe places for children and students from other schools. This study aims to analyze and compare the implementation of high school fire fighting programs in Medan. The method used in this study is descriptive comparative, by taking a sample of 50 students from each school to serve as a sample of knowledge related to the completeness of the implementation of fire disaster management programs. From the results of the study, it can be seen that the education program has not been implemented properly at MAN 2 Model School because only 26% of 100% have practiced in fire evacuation, on the other hand at SMK Dharma Analitika School that the education program has been implemented 100%, in the fire management engineering program at MAN 2 Model School the engineering program has not been implemented optimally because it does not have optimal protection facilities, while at SMK Dharma Analitika School that the education program has been implemented 100%, While at SMK Dharma Analitika School it has been implemented well, in the MAN 2 Model School countermeasure system enforcement program has not been implemented because there is no officer responsible for the maintenance of the system in fire management, while at SMK Dharma Analitika School this program has been implemented optimally.

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INTRODUCTION

Fire is one of the disasters that can have a negative impact on society and needs to be addressed immediately (Qur'aini 2024). Fire is a complex event involving a number of factors, including the nature of the fuel, the availability of oxygen, temperature, and the presence of an ignition source. Fire is one type of disaster that has great potential to cause significant losses if not taken seriously through disaster mitigation efforts (Asiri 2020). Fires can occur in various places, including forests, urban areas, settlements, and office buildings. (Salindeho, Umboh, and Sondakh 2020). The development of Medan City as the third major metropolitan city is indicated by the high population growth rate and the provision of public infrastructure that meets the needs of the community (Syafi'i et al. 2023). Medan City, which is experiencing rapid growth characterized by massive infrastructure development, is also faced with challenges such as increasing fire risk.

Mapping fire-prone areas is a strategic step for disaster mitigation, better spatial planning, and effective risk management (Syafira 2022).

According to data from the Medan City Fire Department, the frequency of fire incidents in the past year reached 216 incidents, resulting in material losses of Rp1,616,812,500,000, as well as casualties and injuries. The lack of well-functioning fire hydrants is one of the obstacles in fire suppression efforts (Medan Fire Service 2022).

To minimize the problem of residential fires, especially in schools, it is necessary to take initiatives in the form of mapping potential fire hazards. With detailed spatial information, disaster prevention and management efforts can be carried out more effectively (Yansya' 2022).

Based on data from the Ministry of Education and Culture, most schools in Indonesia, 75% out of 355,270, are located in disaster-prone zones. Building conditions that do not meet disaster resilience standards, such as weak construction and lack of maintenance, further increase vulnerability to disasters. Therefore, it is necessary to increase the capacity of school buildings in facing disasters (Ramadhani et al. 2020).

Fire protection programs can be divided into three groups, namely (i) Engineering Programs; ensuring buildings and production processes are safe from fire by installing fire detection systems (active) and installing fire protection systems (passive), (ii) Education Programs; increasing employee awareness of the importance of fire prevention, and (iii) System enforcement programs; ensuring all fire safety systems are in accordance with applicable fire codes or standards (Magdalena S 2022).

In schools, there is also a need for a system enforcement program related to fire management so that students, staff and everyone in the school are protected from the risk of fire. Enforcing the system or regulation related to fire management requires an officer or stakeholder who is responsible for the maintenance and implementation of the fire management system. The implementation of fire management in schools not only protects lives and assets, but also builds a safer and more responsive school environment in the face of hazards (Safitri 2020).

A fire management program in every school not only helps reduce loss of life but also preserves school assets and facilities. However, the implementation of this program can vary greatly depending on the strategies and resources available. In terms of fire management approaches, SMK Dharma Analitika Medan and MAN 2 Medan Model have differences (Kusuma et al. 2024).

SMK Dharma Analitika Medan and MAN 2 Model Medan have fire programs that differ in approach and implementation. SMK Dharma Analitika has a PMR Unit with 112 active members, focusing on health and disaster activities, including fire management, while MAN 2 Model Medan puts more emphasis on character education and students' skills in emergency situations, although specific information on their fire program is lacking. Both contribute to disaster preparedness in Medan, but with different focuses (PMI Medan 2023).

Based on this background, this study aims to analyze and compare the implementation of fire management programs at SMK Dharma Analitika Medan and MAN 2 Model Medan. By understanding the effectiveness of the existing programs, it is expected that solutions can be found to improve the response to fires as well as reduce the risks faced by students.

METHOD

This research uses a comparative descriptive method. The descriptive method is to describe existing situations and conditions, and the comparative method is to compare two or more groups or conditions. The purpose of this research method is to see the differences in two or more situations, events, activities, or programs. The comparison is seen from how all elements in the research components are related to each other (Ramadhan 2021). In this study, what is compared is the location, condition of fire extinguishers and the implementation of fire disaster programs in schools. The location used in this research is Medan City High School at SMK Dharma Analitika and MAN 2 Model Medan.

This study combines the observation method, which allows researchers to directly observe social behaviors and interactions, with the questionnaire method to collect quantitative data from a large number of respondents. In this study we observed the implementation program of fire disaster management in Medan City high schools, namely SMK Dharma Analitika and MAN 2 Model Medan. Next is the data collection technique using a questionnaire instrument, which is a data collection tool used to collect large amounts of data (Ardiansyah, Risnita, and Jailani 2023). On the other hand, documentation, is used to document secondary data on research issues, namely monographs, as well as to create a visual representation of the research object using a camera (Ardianto and Saharuddin 2023).

RESULTS

Based on the provisions of Law No. 24/2007, a disaster can be defined as an event or series of events that have the potential to threaten and disrupt the survival of the community. Disasters can be caused by natural, non-natural factors, or human activities, and have the potential to cause casualties and material losses (Ministry of Finance 2007) .

Disasters are a series of events that threaten and disrupt people's lives and livelihoods caused, either by natural factors and / or non-natural factors and human factors resulting in casualties, environmental damage, property losses and psychological impacts. Disasters can be grouped into two, namely natural and non-natural disasters (Danil 2021).

Fire is a phenomenon that occurs when a material reaches a critical temperature and reacts chemically with oxygen producing heat, flame, light, smoke, water vapor, carbon monoxide or other products and effects (Sayuti et al. 2022) . According to (Allen 2008) in (Hidayati et al. 2020) fire disasters have several traumatic effects on individuals, both in physical (somatic) and mental (psychological) aspects. People can experience trauma after facing situations that pose a threat to themselves or others. In addition, a person can also be traumatized when they feel fear, helplessness, negative emotional reactions, or feel deep sadness due to an incident.

This research was conducted at SMK Dharma Analitika Medan and MAN 2 Model Medan, where SMK Dharma Analitika Medan has 115 students and MAN 2 Model Medan has 2184 students. We took a sample of 50 students from each school to serve as a sample of knowledge related to the completeness of the implementation of the fire disaster management program.

Table 1. Percentage of Implementation of Fire Disaster Management Education Program in Schools

Table 2: Percentage of Implementation of Fire Disaster Management Engineering Program in Schools

Table 3. Percentage of Implementation of the Fire Disaster Management System Enforcement Program in Schools.

Table 4. Comparison of Completeness of Implementation of Fire Disaster Management Program in Schools

DISCUSSION

Fire Disaster Management Education Program in Schools

Education is all planned efforts to influence others, both individuals, groups and communities so that they do what is expected by the perpetrators of education. Education is the process of learning from not knowing to knowing (Ardianty et al. 2024) . Meanwhile, according to (Umasugi 2021) , education is the provision of knowledge about certain things as an effort to increase public understanding. A good understanding will create a good mindset as well. The implementation of a disaster mitigation education program in schools has significant benefits in increasing students' knowledge about natural disasters, changing their attitudes towards disasters, and improving their preparedness in dealing with emergency situations. This program can be used as a model for disaster mitigation education in schools of various levels and other disaster-prone areas. However, it is important to continuously evaluate and improve the implementation of this program. Collaboration between universities, schools and local government is the key to success in implementing this program in a sustainable manner. Careful planning, training for the students involved, and development of an appropriate curriculum are needed so that this program can have a greater impact on future disaster mitigation efforts (Sopiyandi and Citra 2023) .

At MAN 2 Model Medan, the education program was not well implemented, with only 13 (26%) students out of 50 (100%) sampled students practicing fire evacuation. In addition, there was also 1 (2%) student out of 50 (100%) students sampled, who did not know the signs of a fire incident and felt that the education program was not useful. This means that the education program not implemented thoroughly for the students in this school. Meanwhile, at SMK Dharma Analitika, the educational program related to fire prevention at school has been implemented optimally and thoroughly.

School Fire Disaster Management Engineering Program

The engineering program is a program that includes fire-safe building planning and fire-safe process planning, for example the installation of fire detection systems (active) and the installation of fire protection systems (passive) (Aulia et al. 2023) . An engineering program in fire disaster management is an approach that uses engineering principles and technology to design, implement, and manage fire prevention, mitigation, response, and recovery strategies. This program aims to reduce fire risk, protect lives, and minimize damage to infrastructure and the environment (Murdani and Mujahidin 2024) . At MAN 2 Model Medan, the

engineering program has not been implemented optimally, because it does not have active fire protection facilities such as fire detection systems, sufficient light fire extinguishers (APAR), and evacuation routes when a fire occurs. Whereas at SMK Dharma Analitika, the engineering program has been better implemented, it just does not have the availability of evacuation routes when a fire occurs.

School Fire Disaster Management System Enforcement Program

A fire disaster management system enforcement program is a set of policies, procedures, and actions designed to ensure effective fire preparedness, response, and mitigation. It aims to minimize the impact of fire on people, property and the environment (Daughter 2023). The system enforcement program ensures that all fire prevention systems comply with fire codes or regulations. To ensure this, inspections of all fire prevention facilities must be carried out regularly (Aulia et al. 2023).

Based on the results of the research, the system enforcement program at MAN 2 Model Medan has not been implemented, such as there is no officer responsible for maintaining the system in fire management at school and there is no clear SOP in dealing with fire incidents at school, so this school does not have preparedness for fire disasters at school. Whereas at SMK Dharma Analitika, the system enforcement program is implemented optimally and thoroughly in this school, meaning that this school has sufficient preparedness in dealing with the possibility of a fire disaster. This school only needs to be evaluated regarding programs that have not been implemented optimally.

CONCLUSION

In this study, the researchers concluded that there are significant differences in the implementation of fire management programs in the two schools studied, namely SMK Dharma Analitika Medan and MAN 2 Model Medan. Based on the three main aspects of fire disaster management programs such as education programs, engineering programs, and system enforcement programs where SMK Dharma Analitika is more optimal in implementing the three programs compared to MAN 2 Model Medan School which is still lacking in implementing education related to fire management, providing evacuation routes and providing fire extinguishers in schools.

From this description, SMA Dharma Analitika has shown concrete steps by having adequate policies, safety facilities, training and awareness. This makes the school better prepared for emergency situations and able to minimize the impact of fire, both in terms of casualties and losses.

In contrast, MAN 2 Model still needs to improve its overall preparedness. The absence of official policies, security facilities, training and education creates a great risk for the school community. If a fire disaster were to occur, this school could potentially suffer more serious impacts due to its lack of preparedness.

Therefore, immediate remedial efforts need to be made at MAN 2 Model to improve the safety of all students and staff. Investing in disaster mitigation facilities, training and education will not only improve safety, but also create a risk-aware culture that can save lives.

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