

## The Level of Preparedness of Grade X Students of SMK Negeri 5 Padang in Facing Earthquake Disasters

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### ABSTRACT

SMK 5 Padang is one of the buildings affected by the 2009 earthquake, since 2012 SMK 5 Padang has never received any socialization regarding earthquake mitigation. The purpose of this study was to describe the level of preparedness of students against earthquakes. The method used in this research is descriptive quantitative. The result of this study indicate that the preparedness of class X students of SMK 5 Padang to indicators of knowledge and attitudes is classified as ready by 85%, policy indicators classified as unprepared by 77%, indicators of the level of emergency response plans classified as unprepared by 79%, indicators of disaster warning systems classified as unprepared by 78%, and indicators of mobility and resources classified as less prepared by 79%.



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### INTRODUCTION

Indonesia is located at the convergence of three of the world's largest tectonic plates, namely the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate [1]. The interaction of these plates increases seismic activity each year. The Indo-Australian Plate moves at a rate of approximately 50-70 mm per year beneath West Sumatra. This condition makes West Sumatra one of the earthquake-prone provinces in Indonesia. In 2009, a 7.6 magnitude earthquake struck West Sumatra [2]. The disaster resulted in 1,117 fatalities, 2 missing persons, 1.214 people severely injured, and 1.888 people slightly injured [3]. Office buildings, hospitals, community health centers, schools, and residential houses suffered damage ranging from minor to moderate and severe levels.

One of the buildings affected by the 2009 earthquake was SMK Negeri 5 Padang. This school is located in a high-risk seismic zone. SMK Negeri 5 Padang is situated at Jalan Beringin Raya No.4, Lolong Belanti, North Padang District, Padang City. The school occupies a land area of 11,670 m<sup>2</sup>, with a building area of 5,099 m<sup>2</sup> and is located approximately 800 meters from the coastline. As a result of the September 30, 2009 earthquake, several buildings within SMK Negeri 5 Padang collapsed and were severely damaged, rendering them unusable.

Based on observations and interviews with teachers and students at the school, disaster preparedness socialization activities have not been conducted since 2017, as the school assumes that such activities are only necessary without waiting for a disaster. To date, students of SMK Negeri 5 Padang rarely receive education or training related to earthquake preparedness. This lack of understanding contributes to the low level of student preparedness in facing earthquake disasters. This study aims to determine the level of earthquake preparedness among students at SMK Negeri 5 Padang.

### RESEARCH METHODS

A disaster is defined as an event or a series of events that threaten and disrupt the lives and livelihoods of communities, caused by natural and/or non-natural factors as well as human activities, resulting in human casualties, environmental damage, property losses, and psychological impacts [4].

Disasters can be classified into three types: natural disasters, non-natural disasters, and social disasters. Various factors can trigger disasters, including unpredictable natural processes, high levels of community vulnerability, infrastructure and urban elements exposed to risk, and the limited capacity of communities to respond to disasters [5].

Earthquakes are categorized as natural disasters that cannot be predicted with certainty. An earthquake is the shaking of the ground caused by the sudden release of energy due to the rupture and movement of the Earth's crust. This is a natural process that occurs repeatedly each year. Regions that have experienced earthquakes in the past are likely to experience them again in the future [6]. Earthquakes can be caused by volcanic activity, tectonic movements, collapses, impacts, and human-induced activities [7]. Earthquakes can also be classified based on their depth and magnitude.

Disaster management refers to a series of efforts that include the formulation of development policies aimed at reducing disaster risks. Preparedness activities include developing and testing disaster response plans, preparing evacuation sites, and organizing data, information, and rapid emergency response procedures.

The parameters used to assess the preparedness of school communities in facing disasters can follow the framework developed by LIPI in collaboration with UNESCO/ISDR in 2006. Preparedness assessment consists of knowledge and attitudes, policies, emergency response plans, disaster warning systems, and resource mobilization [8].

The Ministry of Home Affairs provides guidelines for improving disaster safety in school buildings through activities such as identifying locations and assessing school conditions. It also emphasizes enhancing student safety through educational campaigns and disaster preparedness drills [9].

## RESULTS AND DISCUSSION

The method used in this study is a quantitative descriptive approach. This method aims to describe the level of preparedness of Grade X students in facing earthquake disasters. The population for assessing preparedness consists of all Grade X students of SMK Negeri 5 Padang, as presented in Table 1 below:

**Table 1. Building Population**

No	Vocational Study Program	Number of Students
1	BKP	24
2	DPIB	64
3	TAV	97
4	TITL	133
5	TP	65
6	TKR	68
7	TBSM	34
8	TKJ	32
	Sum	517

Source: Student Data of SMK Negeri 5 Padang for The 2021/2022 Academic Year.

The sampling procedure in this study involved determining the sample size, in which each study program had an equal opportunity to be selected as part of the sample. Considering that the population exceeded 100 individuals, a proportional random sampling technique was employed. According to Yusuf (2014), proportional random sampling is used when the population is stratified or grouped.

Referring to Arikunto (2006), the proportion of samples in proportional random sampling can range from 10-15% or 20-25%, and higher when the population is more than 100. Therefore, this study selected a sample of 30% from each stratum or group.

**Table.2 Student Population**

No	Vocational Study Program	Number of Students	Number of Samples
1	BKP	24	8

No	Vocational Study Program	Number of Students	Number of Samples
2	DPIB	64	20
3	TAV	97	30
4	TITL	133	40
5	TP	65	20
6	TKR	68	20
7	TBSM	34	11
8	TKJ	32	10
	<b>Sum</b>	<b>517</b>	<b>159</b>

Source: Student Data of SMK Negeri 5 Padang for The 2021/2022 Academic Year.

To assess students preparedness, a questionnaire consisting of 43 items was used. The instrument employed the Guttman scale, which is designed to obtain clear and definitive responses to specific issues, such as “yes-no”, true-false”, “even-never”, and “positive-negative”. Students were asked to mark (√) the answer that best represented their condition.

To ensure data accuracy, the questionnaire was pilot-tested on 30 students outside the research sample. The purpose of the pilot test was to evaluate the instrument as a reliable tool measuring earthquake preparedness. The result of the pilot test indicated that 11 items were invalid and therefore excluded. Consequently, 32 items were retained and used as the measurement tool to assess the preparedness of Grade X students at SMK Negeri 5 Padang toward earthquake disasters. The level of students preparedness was analyzed using descriptive statistical techniques, specially by applying a percentage formula.

$$P = \frac{F}{N} \times 100\%$$

Information:

F = Frequency of Answers from Each Data

N = Number of Samples

P = Presentation

The average percentage score of students knowledge level regarding earthquake mitigation was calculated using an interval scale percentage approach [10].

**Table.3 Interval Scale**

Interval (%)	Description
90-100	Very Prepared
80-89	Prepared
65-79	A little bit Prepared
55-64	Not Prepared
0-54	Totally Unpreped

The results of the analysis of students preparedness for earthquake measured by five indicators can be shown in the following table.

**Table.4 Level of Knowledge and Attitude**

No	Class	Preparedness	Information
1	DPIB	89%	Prepared
2	BKP	72%	A little bit Prepared
3	TKRO	87%	Prepared
4	TPM	89%	Prepared
5	TKJ	81%	A little bit Prepared
6	TBSM	88%	Prepared
7	TITL	88%	Prepared
8	TAV	89%	Prepared
	<b>Sum</b>	<b>85%</b>	<b>Prepared</b>

**Table.5 Policy Level**

No	Class	Preparedness	Information
1	DPIB	69%	A little bit Prepared
2	BKP	78%	A little bit Prepared
3	TKRO	74%	A little bit Prepared
4	TPM	76%	A little bit Prepared
5	TKJ	73%	A little bit Prepared
6	TBSM	82%	Prepared
7	TITL	80%	Prepared
8	TAV	81%	Prepared
Sum		77%	A little bit Prepared

**Table.6 Emergency Response Plan Level**

No	Class	Preparedness	Information
1	DPIB	87%	Prepared
2	BKP	63%	A little bit Prepared
3	TKRO	79%	A little bit Prepared
4	TPM	85%	Prepared
5	TKJ	82%	Prepared
6	TBSM	79%	A little bit Prepared
7	TITL	78%	A little bit Prepared
8	TAV	79%	A little bit Prepared
Sum		79%	A little bit Prepared

**Table.7 Disaster Warning System**

No	Class	Preparedness	Information
1	DPIB	88%	Not Prepared
2	BKP	59%	A little bit Prepared
3	TKRO	77%	A little bit Prepared
4	TPM	84%	Prepared
5	TKJ	89%	Prepared
6	TBSM	75%	A little bit Prepared
7	TITL	76%	A little bit Prepared
8	TAV	79%	A little bit Prepared
Sum		78%	A little bit Prepared

**Table.8 Disaster Warning System**

No	Class	Preparedness	Information
1	DPIB	65%	A little bit Prepared
2	BKP	47%	Prepared
3	TKRO	61%	A little bit Prepared
4	TPM	68%	A little bit Prepared
5	TKJ	66%	A little bit Prepared
6	TBSM	57%	Not Prepared
7	TITL	62%	A little bit Prepared
8	TAV	60%	A little bit Prepared
Sum		61%	A little bit Prepared

## RESULT AND DISCUSSION

Student preparedness was measured using a framework developed by LIPI in collaboration with UNESCO/ISDR (2016). The preparedness assessment is based on five indicators. Knowledge influences an individual's attitude toward a particular issue, including disaster preparedness. The measurement of knowledge and attitudes toward earthquake preparedness includes understanding disasters, events that trigger disasters, causes of earthquakes, characteristics of strong earthquakes, earthquake-resistant buildings, and appropriate actions during an earthquake. The analysis shows that students' knowledge and attitudes are categorized as prepared, with a score of 85%.

The policy and guideline indicator includes educational related to school community preparedness. Referring to Law No.24 of 2007 concerning Disaster Management and other relevant regulations, schools are expected to prepare for disaster preparedness. This includes establishing a School Disaster Preparedness Team, integrating preparedness materials into relevant subjects or extracurricular activities, and ensuring safe school infrastructure. The result indicates that this indicator is categorized as less prepared, with a score of 77%.

The emergency response plan relates to evacuation, rescue, and relief efforts aimed at minimizing disaster impacts. Evacuation planning includes designated evacuation areas, evacuation maps and routes, equipment and supplies, drills or simulations, and evacuation procedures. Self-rescue and the protection of important documents are also essential. The analysis shows that this indicator is categorized as less prepared, with a score of 79%.

The early warning system indicator includes warning signs and the dissemination of disaster-related information. The results show that this indicator is categorized as less prepared, with a score of 78%.

The resource mobilization indicator reflects the school's ability to mobilize human resources through disaster preparedness groups established by the school. The analysis indicates that this indicator is still categorized as less prepared, with a score of 61%.

## CONCLUSION

Based on the objective of this study, which is to describe the level of buildings safety and the preparedness of Grade X students at SMK Negeri 5 Padang toward earthquake disasters, the following conclusions can be drawn:

The level of student preparedness was measured using the framework developed by LIPI in collaboration with UNESCO/ISDR. The preparedness assessment is based on five indicators. The first indicator, knowledge and attitudes of students in facing earthquakes, is categorized as prepared, with a score of 85%. The second indicator, policy, is categorized as less prepared, with a score of 77%. The third indicator, emergency response planning, is also categorized as less prepared, with a score of 79%. The fourth indicator, disaster early warning, is categorized as less prepared, with a score of 78%. The fifth indicator, resource mobilization, is categorized as less prepared, with a score of 79%.

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