BAB 1. INTRODUCTION

1.1. BACKGROUND

Tsunami is a disaster associated with sea waves. It can be defined as a very large sea wave that moves in all directions. Sudden changes in the shape of the sea floor can cause tsunamis. These changes in the sea floor can be caused by earthquakes or volcanic eruptions(Rahayu, 2023).

Indonesia's geological conditions cause Indonesia to have a high risk of earthquake and tsunami disasters. Indonesia is a country geologically located between three tectonic plates, namely the Eurasian plate, the Indo-Australian plate, and the Pacific plate. Indonesia is also located at the confluence of two active mountain roads, namely the Mediterranean circumference, which passes through western Indonesia and extends from the Mediterranean Sea in Europe, and the Pacific circumference to the east originating from the American continent, precisely in the Rocky Mountains(Setya et al., 2023). Similar to Indonesia, Japan is also located between three tectonic plates. This causes Indonesia and Japan to have the same potential to face tsunami disasters(Adri et al., 2020).

On December 26, 2004, a tsunami occurred in Aceh; this incident sparked concern among the residents of Padang City about the tsunami disaster. This concern is reasonable because Padang faces the Indonesian Ocean(Ophiyandri et al., 2022). This also happened to the people of Nankoku City, where on March 11, 2011, an earthquake of magnitude 9.1 caused a tsunami in the Tōhoku region; the same concerns arose among residents of Kochi prefecture, where Nankoku City is a coastal part of Kochi prefecture(Muhammad et al., 2021).

One effort that can be made to minimise the number of victims resulting from the tsunami disaster is to have a comprehensive disaster management strategy, especially at the preparedness stage. Mitigation is necessary as an action or preventive effort to minimise the negative impact of disaster damage in terms of both human and material casualties. Mitigation can be structural or non-structural. Structural mitigation in the form of infrastructure development that supports community evacuation systems in disaster-prone areas is also an anticipation for the future and a long-term investment for community welfare(Nisa et al., 2020). At this stage, efforts can be made to provide a tsunami shelter. More concern is needed for the

construction planning and management of the shelter building. Structurally, the shelter building must be strong and able to resist the burden of earthquakes and tsunamis. The shelter building can be multi-functional without losing its main function. The location of the shelter building is less than 1 km from the concentration of the population, which is in the network of streets that can be reached from all directions on foot for all populations(Rita et al., 2017).

The location criteria for shelter in Indonesia are within the reach of the population to be served during evacuation time, at the safe breaking wave zone, a minimum of 200 meters from the coastline, and at the main road to be found, considering the attitude of evacuates who will move away from the coast(Rita et al., 2017). Shelter can be reached at the average walking speed of people with disorders or walking on a crowded street, assumed at 3.22 km per hour or 53.5 meters per minute. The average walking speed of a healthy person is 6.44 km per hour or 107 meters/minute.

Currently, the city of Padang has three buildings that function specifically as tsunami shelters, namely the Darussalam Shelter (Bungo Pasang Village), the Nurul Haq Shelter (Parupak Tabing Village), and the Ulak Karang Shelter (Ulak Karang Village) Maintaining shelter buildings can be a challenge, especially when it comes to factors such as funding, resources, and general management. These three things can be said to be the minimum determinants that a shelter can be maintained properly, which, in the end, can make a significant contribution during an emergency(Susanto, 2023).

In Padang City, the management of two shelters has legality in the form of a Decree (SK) from the shelter management issued by BPBD Padang City. However, shelter maintenance management still needs a lot of improvement. An earthquake disaster with the potential for a tsunami never knows when it will come. Evacuation during a disaster plays an important role both before, during, and after a disaster occurs. The shelter building is a disaster mitigation effort to optimise three critical times (before, during, and after) in evacuating an earthquake disaster with the potential for a tsunami in the city of Padang(Susanto, 2023).

Meanwhile, with the daily utilisation of tsunami evacuation towers, Japan implements two types of shelters: locked and unlocked. Locked shelters are designed to safeguard the facilities within. These shelters can be opened in several ways. If the shelter employs a "kick-open" door, it can be opened by kicking the center of the door. Some shelters have vibration sensors; the door will automatically open upon sensing vibration. Additionally, shelters use

locked doors, with keys typically entrusted to the area's neighborhood association leader (隣組). Also, keys will be located in a box that can be opened upon detecting vibration. This box can also be opened with an operational signal controlled by the fire department. Meanwhile, unlocked shelters are typically buildings intended for tourism purposes (Nishikawa, 2020).

The disaster training the Japanese community practices effectively instills a disaster-responsive attitude when disasters occur. Disaster training conducted by the Japanese community is part of disaster mitigation education, which prepares communities to be ready before, during, and after disasters. One of the successes of this disaster mitigation education can be seen in The Miracle Kamaishi, where students directly practiced what they had trained for years. When we look at it, success is not solely attributed to one component; other key factors contribute to the success of disaster mitigation education. Significant roles and cooperation are needed, such as forming groups within the community and acting as facilitators(Widiandari, 2021).

1.2. OBJECTIVES AND BENEFITS

1.2.1. Objective

The objective of this research is:

1. To assess the building condition of tsunami shelters in Padang City, West Sumatra, and Nankoku City, Kochi Prefecture.
2. To assess the management system of tsunami shelters in Padang City, West Sumatra, and Nankoku City, Kochi Prefecture.
3. To give recommendations for improving the condition of tsunami shelters in Padang City

1.2.2. Benefits of research

The benefits obtained from this research are:

1. Information on the advantages and disadvantages of the condition of shelter buildings and shelter management in each city.
2. Providing data-driven recommendations to support government policies and decision-making for shelter improvement.

1.3. SCOPE OF PROBLEM

For the discussion in this research to be more focused and directed, it is necessary to delimit the problem. The problem delimitation carried out is:

1. This research was carried out in 2 areas: Padang City, West Sumatra, and Nankoku City, Kochi Prefecture.
2. The buildings studied were the tsunami shelters in the Padang City area, the Darussalam Shelter (Bungo Pasang Village), the Nurul Haq Shelter (Parupak Tabing Village), and the Ulak Karang Shelter (Ulak Karang Village) and in the Nankoku City area, the Ominato Konan Evacuation Tower and the Sports Center Tower.