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Survey of People Perception on the Resulting Noise from the Sultan Ismail Petra Airport, Kelantan, Malaysia

Aweng, E.R.1*, **Sharifah Aisyah, S.O.1** and **Liyana, A.A.2**

¹Faculty of Earth Science, Universiti Malaysia Kelantan, Locked Bag No. 100, 17600 Jeli, Kelantan, Malaysia

²Centre for Language Studies and Generic Development, Universiti Malaysia Kelantan

E-mail: aweng@umk.edu.my

Abstract. Around the Sultan Ismail Petra Airport, Pengkalan Chepa, Kelantan, Malaysia there are housing areas, educational institutions, schools, hospitals and even houses of worship that are categorized as sensitive recipients. They've been receiving noise from the airport for decades and they are still there. They may feel uncomfortable but have no choice, or are they no longer aware of the disruption they receive on a daily basis or they can already accept the noise with an open heart. To answer this question an informal conversational interview was conducted. A total of 120 respondents were selected, 40 respondents per contour (500m, 1000m and 1500m). Results of the survey found that 50% (60 people) of respondents said the noise effect of the flight was strong, while another 25% said that the noise effect was moderate (30 people) and low (30 people). Most of the respondents who said the noise impact from the airport are strong came from respondents who sited within 500m from the airport. Meanwhile, for those who answered moderate and low was from 1000m and 1500m radius from the airport. As a conclusion, people who are leaving within 500m from the airport was badly affected by aircraft noise, So it needs to be rectified to avoid permanent hearing damage and stress problems for the residents.

1. Introduction

Nowadays, the problem of aircraft noise in Malaysia is one of the issues which need special attention by the government. Sultan Ismail Petra Airport, located in Pengkalan Chepa, Kelantan which was surrounded by housing and some other sensitive recipients also one of its kind. Therefore, these communities at those areas are becoming more sensitive to noise disturbance issues and have rising expectations in regard to the quality of life. The noise at points on the ground from airplanes flying in and out of a nearby aerodrome depends on many factors. Principal among these are the types of airplanes and their power plants; the flap, power and airspeed management procedures used on the airplanes themselves; the distances from the points concerned to the various flight paths; and local topography and weather. Generally, airport operations consisted of different types of airplanes, various flight procedures and a range of operational masses. Thus, the noise level will be various from one time to another.

Aircraft noise is a much more restricted problem than surface transportation noise, since it is significant only around airports [1]. Since aircraft landing in inner-city airports are often lower than 60 meters (200 ft) above roof level, a sound level above 100 dB(A) can be realized. Noise was also transmitted during taxing as the aircraft use taxiways to taxi from one place on an airport to another; for instance, when moving from a terminal to the runway and it was also posted during takeoff.

In 1968, the Assembly of International Civil Aviation Organization (ICAO) documented the seriousness of the problem and called an international conference on the subject of aircraft noise in the vicinity of airports and it leads to worldwide problems. Therefore, some guidelines and standard was developed, documented, gathered and recommended such as Annex 16 in 1969, gathered essential



international guidelines and standards for noise control at airports in the form of standardized recommendations [2].

Compared to aircraft noise in and around airport which causes problem and pollution, other sources of noise in airport, for instance from motor vehicles (such as cars and buses for airport operations and passenger, employee, and rental agency vehicles as well as ground service equipment such as aircraft tugs, baggage and belt loaders, generators, lawn mowers, loaders, tractors, air-conditioning units, and cargo moving equipment) generated less noise [2]. Consequentially, the extreme noise levels can cause a hearing damage as well as other unpleasant effects, for instance sleep disturbance and interference with work and recreation.[3] reported that, high levels of aircraft noise are known to increase blood pressure and contribute to hearing loss. On the other hand, [4] claimed that, other vitality-related health such as tiredness and headache were also associated with aircraft noise, whereas the other physical problems were not. Long-term aircraft noise exposure may increase the risk for hypertension as well[5]. In fact, any sound louder than normal conversation can damage the structure in the inner ear that converts sound waves into auditory nerve signals. Initially damage to the structure in the inner ear may be temporary, but with repeated exposure, the damage becomes permanent and tinnitus maybe develops. Research by the National Institutes of Health (Rosen and Olin, 1965) says, roughly 70 million American are exposed to sound level that can interfere with their function at work or disrupt sleep and some of them exposed to health risk such as cardiovascular and immunological from environmental noise. In addition, there are also psychological effects occur from aircraft noise. Same goes to the health effect, residential pleasure and noise reactions such as annoyance may be reciprocally associated with each other [6]. Noise is the thing such like annoying to some of people where it can lead to people feeling angry and stressed. It may interfere with conversations and relaxation activities at home, discourage people from using outdoor spaces, and disrupt activities requiring concentration. [7] stated few factors how the noise become annoying. First of course fear of accidents, anxiety about air crashes may increase some people's sensitivity to aircraft noise. Noise may be more annoying if it occurs often, even if each noise event is quieter. When those recipients cannot run away or alter or escape the noise source it may make them more annoying. Not only that, airport noise recipients also fear of the future growth in air travel and potential increases in the frequency of flights. Noise levels below 50dB(A) Leq are moderately annoyed the community while, levels below 55dB(A) Leq are seriously annoyed some peoples during the daytime [8]. In the UK, the Department for Transport (DfT) uses a level of 57dB(A) Leq as an indicator of the onset of community annoyance in daytime. Even so, there are likely to be people exposed to lower than 57dB(A) Leq who will be affected, and also those exposed to more the levels who will be not affected [9]. On the other hand, high noise level can also disturb sleep. Interference with sleep patterns is frequently reported by those living close to airports operating night flights. Other effects of high noise level are educational achievement among students living in the area normally drop due to noise disturbance. Besides that, it can also cause cardiovascular effects [10] and mental health where there is evidence that noise can affect existing mental illness [11]. Hypertension is another effects where there is an increase in the percentage of people with hypertension reported worldwide[12].

Currently, there was very few information on how airport noise posted by Sultan Ismail Petra Airport, Pengkalan Chepa, Kelantan, Malaysia affected people living within 1500 meter radius from the airport. Hence in order to get the information, a study of current condition of people perception on noise posted by the Sultan Ismail Petra Airport is needed for the authorities to use as a basis for decision making related to the siting and zoning as well as proposing any mitigating measures to reduce the impacts.

2. Materials and Methods

Sultan Ismail Petra Airport is the only airport that operates in the state of Kelantan, Malaysia. The airport offers flights between a total of five domestic destinations from Malaysia Airlines System (MAS), AirAsia and Firefly. This made it the busiest airport in the East Coast of Malaysia by passenger traffic and aircraft traffic movement. In 2010, the airport handled 1,047,000 passengers, with 75,906 total aircraft movements. One of the factors that contributes to increase of passengers is not only local community movement but also due to increase of tourism activities in Kelantan [13]

The study area background study was carried out at Federal Department of Town and Country Planning, Kelantan before an unstructured interview carried out. For the purpose of this study, an informal conversational interview session was conducted at four sampling point per contour (500m, 1000m and 1500m). In total of 120 respondents were selected, where 10 respondent per sampling points (40 respondents per contour) that involved few settlements including traditional village and modern housing area. The village involves are Kampung Pauh and Kampung Telok Kitang, meanwhile, modern housing involves are Taman Pinggiran Golf 3, Taman Padang Golf, Taman Rimbulan, Taman Idaman, Taman Baung Perdana and Taman Sentosa. Sampling area can be referred to Figure 1 below.

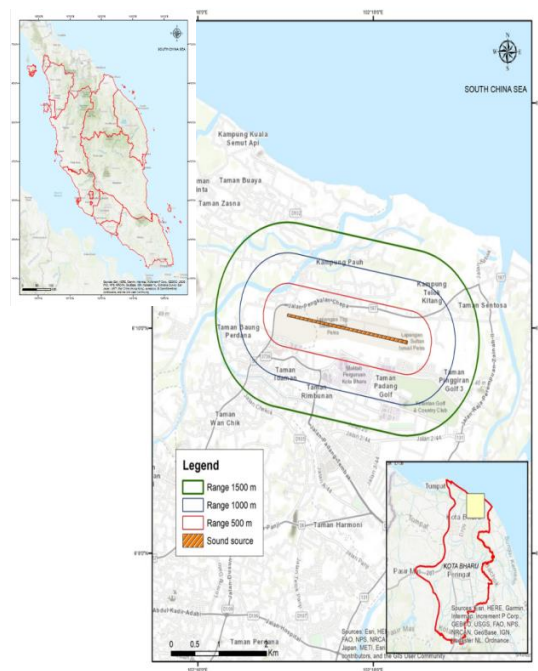


Figure 1. Study Area

3. Results and Discussion

Based on the data of land use map provided by the Federal Department of Town and Country Planning, Kelantan, land use in Pengkalanchepa area, to be specific, in Sultan Ismail Petra Airport (SIPA) are divided into several categories which are modern residential, traditional village, educational institutional (universities and schools), military camp, industrial area and clinics as shown in Figure 2. Total residents of Pengkalanchepa area are approximately 52,530 peoples. Based on the land uses map, majority of the area is covered with the residential area. In fact, 500 meters away

from the airport compound is including the residential, clinics, kindergarten and also academic institutional (universities and schools). According to the noise exposure level at the area, both day and night are exceeded the standard and the residents are complained during the interview session. This proves that the siting and zoning for the places are not suitable since the sensitive area is within the sensitive zone. This should be avoided and the local authorities have to take seriously about this matter. Nevertheless, areas within 1 kilometer up to 1.5 kilometer from the airport compound are acceptable for siting and zoning due to less impacts from the airport and this area are covered by golf club, residential areas, military's camp and schools as well.

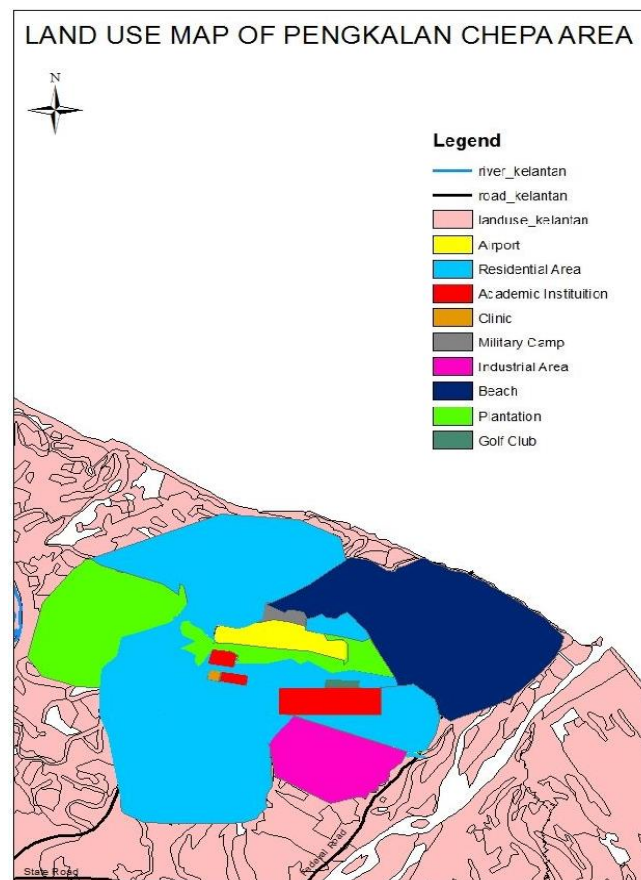


Figure 2. Distribution of land uses in the surrounding of the airport (up to 1.5 km radius)

Based on the informal conversational interview session among the residents which was conducted, where 10 respondents are chosen for each sampling location reported that, 50 percent of respondents said the impacts are strong, followed by 25 percent said the impact is moderate and another 25 percent said low. However, 120 respondents are the people interviewed within 500 meter, 1 kilometer and 1.5 kilometer from the boundary of the airport. Hence, the impacts for each radius of area are different.

The conversation from the interview session has been analyzed and summarized in a brief explanation. For the first four sampling location which is within 500 meters away from the boundary of airport, most of residents said the aircraft noise level is strong and they are annoyed, indeed. Back

to the impact that should be identified, some said sometimes they are stressed because of the noise from aircraft. One of the University students said, the noise from aircraft is very interrupting when they are studying. Even the school teacher also thought the same, especially during the teaching and learning session. Students were easily losing their focus in class. Everyone who responded experienced the sleep disturbance especially during the night time when the flights are departed and landed. Effect from this, they are feel tired on the next day and less of energy to continue their life routine activities, ultimately, affected their overall performance. These is in agreement with previous study that aircraft noise can lead to the stress and hypertension [4, 5].

In addition, from the conversation with a mother of one child, she told that her daughter having a phonophobia which is fear to the loud noise. Unfortunately, her house is located nearby the airport, so, every day they hear the loud noise from aircraft and her daughter getting fear. This matter seems to be a problem towards respondent and yet she feels anxious about it. Another conversation with respondents, they only feel annoyed with aircraft noise during night time because it bothers their leisure time. This showed that the noise from aircraft indirectly give mentally health effects to the residential community [6].

Despite all the problems related to noise posted by the Sultan Ismail Petra Airport, most of people living in the vicinity particularly around the airport, did not complaints against the airport or any authorities because they believe their complaint will not be entertained. At the same time, they said they are used to it and still can bear the current impact but they said, if the impacts are getting worse then will make a report. Thus, even though the aircraft noise impacts are adversely impacted to people living surrounding the airport but because they still can absorb the impacts; they did not make any complaints.

The other respondents are those who are living within 500 m to 1 km radius from the boundary of airport. Based on the conversation with all respondents at this area, they still can hear the sound of aircraft but not too noisy. Everyone give the same answer and has been proved by officer at the Department of Environment, Kelantan where they said they did not receive any complaint so far. Nevertheless, a few impacts are still there. Some of the respondents said, sometimes at night they felt annoyed with the noise and having sleep disturbance. According to the studies, environmental noise may impact differentially on different sleep stages, for example, aircraft noise induced sleep disturbance may be more likely to occur during later parts of the night, because there is less slow-wave sleep and sleep pressure is reduced [14]. There is one man who is works as teacher said; he was interrupted when the aircraft pass by during his teaching time because his school is within the study area. He added, sometimes, students also complaint about it. But majority of people living within 1km radius from the airport said that, the noise from aircraft is not going to create significant problem to them. They just take it as a common thing. In addition, they hear it every day and almost every hour so it already immune to them. The was one respondent who said that, even though there is an impacts it will not give a significant one since the airport is not operate 24 hours. The last group of respondents are located within 1 km to 1.5 km radius from the airport. All the respondents said no impacts but if there is any, it just very minimum. The aircraft sound also weak when it passes through the area. Thus, it will not affect surrounding people. In the conversation, some of them said they know nothing about impacts of aircraft noise as they never exposed to the loud one.

Generally, results of the survey found that 50% (60 people) of respondents said the noise effect of the flight was strong, while another 25% said that the noise effect was moderate (30 people) and low (30 people) respectively (Figure 3). Most of the respondents who said the noise impact from the airport are strong came from respondents who sited within 500m from the airport. Meanwhile, for those who answered moderate and low was from 1000m and 1500m radius from the airport.

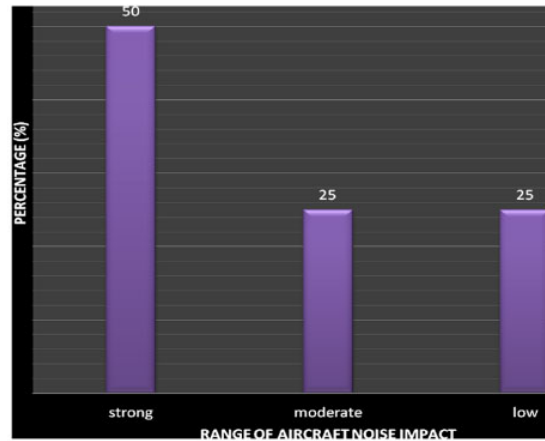


Figure 3. Severity of aircraft noise based on people perception

4. Conclusions

As a conclusion, people who are sitting within 500m from the airport says the aircraft noise was strong and they are badly affected by aircraft noise. So, it needs to be rectified to avoid permanent hearing damage and stress problems for the residents. The airport somehow needs some noise abatement and control to provide the best condition for communities nearby.

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