

A Study of Land Use to Control Airport Noise with Noise Contour Modelling (WECPNL Index)

A Case Study: Husein Sastranegara Airport – Bandung, Indonesia

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1. Introduction

The existence of airports in a region would bring both positive and negative impacts. In general, the most significant negative impacts of airport operations is an increase in noise at the airport and surrounding areas. This noise is caused by aircraft operations. Frequency noise generated will increase with increasingly dense air traffic flow at the airport. Noise is unwanted sound because it does not fit the context of space and time so that may interfere with the comfort and human health. Noise can interfere with conversations that affect ongoing communication, otherwise it can cause psychological disturbances such as irritability, anxiety and fear. Psychological disorders due to noise depends on the intensity, frequency, period, time and duration, the complexity of the spectrum / noise and the sound does not irregular noise. Noise can cause disruption to the work being carried out by someone with psychological disorders and impaired concentration, thus decreasing productivity. Noise has the potential to interfere with human health when people hear the high intensity of sound in a period of time and continuously, which one day will pass through a boundary due to noise which will cause loss of hearing.

There are several ways that can be used in efforts to control noise at airports and surrounding areas, one of which is by land use at the airport and surrounding areas. To be able to determine the land use at the airport and surrounding areas, the appropriate and necessary method/way is by developing a noise contour map that serves as a reference in land use at the airport and surrounding areas. One method to develop the contours of the noise at the airport and its surroundings recommended by the International Civil Aviation Organization (ICAO) is WECPNL index.

2. Problem Description

Noise is the most significant negative impacts caused by airport operations. This negative impact of causing disruption to human comfort and health. Therefore we need to control the noise so that its impact can be minimized. One of the control measures that can be done is by land use at the airport and surrounding areas. Using the airport noise contours, it can be determined strategy of land use appropriately.

In Indonesia, equipment and software that can be used to create airport noise contours are still very limited, besides human resources and cost. Therefore, it takes a certain method that can be used to make WECPNL index noise contour of airport with a simple model that easier to run by airport operator.

3. Purpose

This study is to assess land use for noise control at airports by making WECPNL index noise contour ng Matlab program. The purpose of this study is to:

- a. Determine the effect of distance, schedules and flight frequency to the level of noise at airports and surrounding areas.
- b. Formulate a model to determine the contours of the noise level at the airport and surrounding areas.
- c. Determine of the WECPNL index noise contour map at airport.
- d. Determining noise control strategies related land use in airports and surrounding areas.

4. Methodology

The method used in this paper research is a series of processes performed during the execution of research include: data collection, processing and data analysis, the discussion came to making the final paper report.

1) Research Flowchart

The research flowchart is shown in **Fig.1**.

2) Analysis Methods

For the modeling of noise contours used Matlab program, ie by entering the necessary data, then the program generates an noise contour model with boundaries as in **Fig.2**.

3) Model Development

Model developed is accordance with **Fig.3** flowchart.

4) Noise Contour Model Validation

To ensure that the resulting noise contour model according to actual circumstances, it would require validation, that is by re-measurement at several points that were randomly selected for sampling noise. Furthermore, WECPNL index sampling results and compared with the noise contour map model that has been generated.

5) Land Use Analysis

Analysis of noise control to be implemented is the analysis of noise control by analysis of land use at the airport and surrounding areas. This analysis is based on noise contour maps that have resulted from the Matlab program.

5. Conclusions

Noise contour in the airports is a requirement for the airport to make it, so it can make right land use planning. But most airports in Indonesia do not have it, because of the limited tools, human resources, and costs. With this noise contour model is than expected that all these problems can be overcome.

References

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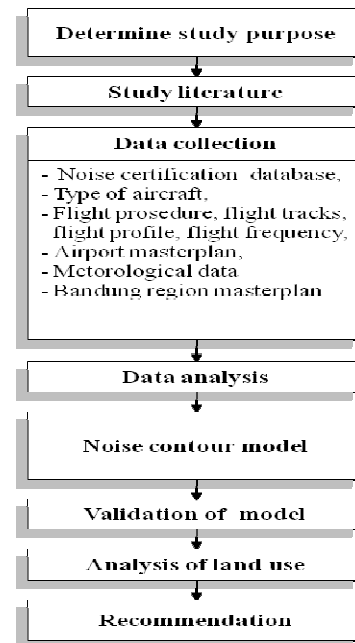


Fig.1 Research flowchart

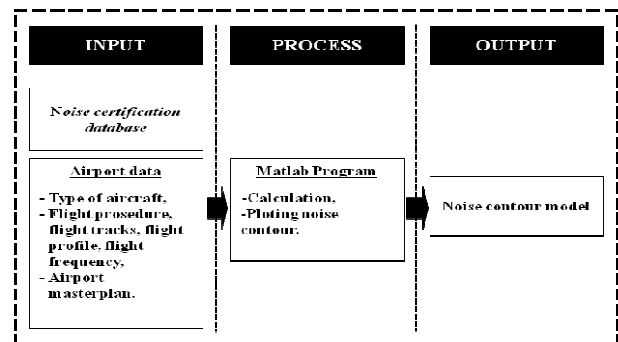


Fig.2 Matlab program process flowchart

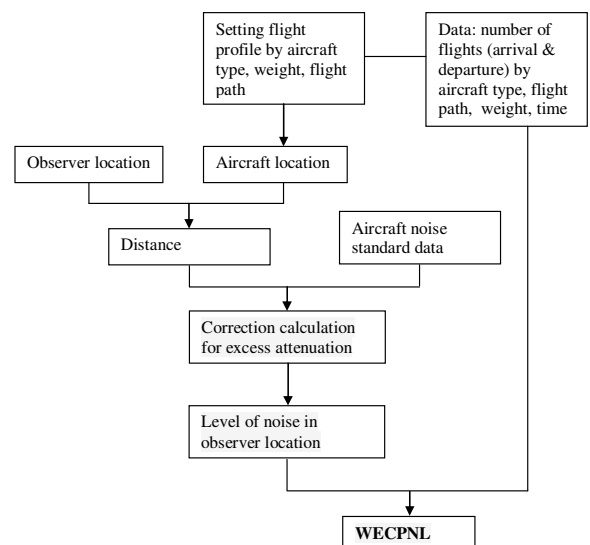


Fig.3 Prosedure of WECPNL prediction