CHAPTER V
CONCLUSIONS, IMPLICATIONS, AND SUGGESTIONS

5.1.Conclusions

In this research, author aims to identify the building performance of traditional Chinese architecture in different climate conditions, primarily in Indonesian climate. This research also aims to find what elements need to be modified in order to reach Indonesian building performance standards and comfort standards. After conducting the necessary steps to complete the research, author has concluded several points as follows:

a) Traditional Chinese architecture – in this case *Roemah Oei*/House of Huang as it stands now fails to reach Indonesian thermal comfort standards. Complex's management however, states that the complex is still comfortably warm even in soaring heat of ±30˚C all year round. This proves that acclimatization played a part in helping people adapt to the tropical climate.

b) After the simulation, author has discovered that most of the heat came from the front gate and the middle courtyard in the form of radiative heat. The modification done to the model includes reducing radiative heat from both the front gate and the courtyard, and rerouting heat from cooking activities. All of this modifications use window panes to help absorb the radiative heat and reflect some of it. All modifications presented follows the guideline for Indonesia's principles for heritage building preservation.

c) Historical model simulation also shows that constructing the homestay as the complex's extension by being a heritage museum played a significant part in changing in-complex airflows and solar radiation distribution thoughout the whole complex. It is shown that while activities do change how a zone behaves, adding another building in a specific part of the complex will change its airflow signature.

d) Post-modification simulation, author has concluded that the modifications mentioned in the previous point yield the closest results to reaching Indonesian thermal comfort standards, yet still – it fails to reach the margins presented by SNI. However, since the PMV results show a trend of decreasing across the board post-modification, it shows that the modifications succeed in reducing overall heat absorbed into the building; even at the expense of being more humid.

5.2.Implications

The thermal comfort study conducted in this research has implications regarding a traditional Chinese architecture style building perform in tropical conditions in particular Indonesia's tropical climate. Every country has its own biome distributions and different climatic conditions (Beck, et al., 2018); that may lead to different results in simulations if done in different countries. For example, Indonesia shares the same classification of Af (tropical rainforest) in the Köppen-Geiger climate classification map with several regions in countries along the equatorial zone according to an improved climate classification map by the same authors (Beck, et al., 2018). Assuming the same site conditions, combination of factors such as daily maximum/minimum temperatures, relative humidity, precipitation, rain days, and hours of sunshine will affect the simulation differently. However, this specific study can be used as a reference point for future studies regarding thermal comfort and building performance of traditional Chinese architecture style buildings in tropical climates.

In this research, the architectural style used in the sample (Hui-style) has an origin in Anhui Province – a province with a classification of Cfa (humid subtropical). Since the indigenous style is designed and built to adapt to such climate, a trend in temperature increase which leads to a higher PMV index in simulated tropical environments is to be expected. The same methods used in this research may also be reproduced in other research with similar topics.

5.3.Suggestions

This research has been conducted through various limitations and difficulties ranging from physical survey difficulties to modelling and simulation limitations detailed in Chapter 3.4. However, future researchers wishing to further this specific study may take into account – and hopefully capable of bypassing/overcome the various limitations and difficulties in conducting this study. Other researches relevant to this study; be it on thermal comfort study on other types of architecture, on climate difference and climate change, or similar studies using DesignBuilder as a software of choice for the study; will need to take the software's limitations in various aspects from project set-up, modelling, and simulation.

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