

**THERMAL DESIGN OF WALLS FOR OPTIMUM ENERGY PERFORMANCE
FOR LOW-RISE RESIDENTIAL BUILDING VIA COMPUTER SIMULATION
USING ENERGY 10**

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ABSTRACT

THERMAL DESIGN OF WALLS FOR OPTIMUM ENERGY PERFORMANCE FOR LOW-RISE RESIDENTIAL BUILDING VIA COMPUTER SIMULATION USING ENERGY 10

This study is about to find the thermal design of walls for optimum energy performance for low-rise residential building via computer simulation. This study focuses on the difference between conventional construction and non-conventional construction. The objectives for this study are to identify and compare the database for building envelope in Energy-10 with the available data in Malaysia for walls, to monitor the external and internal climates of selected low-rise residential building and to predict the cooling energy of the building model for several wall constructions using Energy-10. This study was done in three sections which are compiling the database, logging the selected houses and running the energy simulation software. The database had been compiled from several sources which are text books, journals, government reports and the practitioners of housing industry. The database that compiled is the thermophysical properties of building material for wall. Logging was done on two different houses. The first house is a non conventional construction house that located at Bandar Tasik Selatan Semenyih, Selangor. The second house is a conventional construction house that located at Seksyen 6, Shah Alam, Selangor. The temperature for the indoor and the outdoor of the house were analysed. Computer simulation were done using Energy 10 software to predict the cooling energy for the residential building. There were 4 building model for this simulation that using different type of wall which are normal wood wall, normal brick wall, normal concrete wall and aerated concrete wall. From that simulation, the building model with aerated concrete wall is 26% save energy than normal concrete wall, 18% save energy than normal brick wall and 20% save energy than normal wood wall.

1 CHAPTER 1

INTRODUCTION

1.1 Background of Study

The primary purposes for human are for shelter, comfort and functionality. First purpose is for shelter for human protection from rain, cold/heat, wind, sun radiation and intrusions. There are three types of comfort in buildings which is Thermal comfort, visual comfort and acoustic comfort. The functionality of the building are will give effect to the decorations and design of the buildings. The content functionality of the building will relate to the energy consumption to the building. Today most of the residential buildings in Malaysia are the modern styles. So it is really important to document the energy performance of the house because we need to know the thermal condition of modern contemporary houses. From that documentation, it would give us a clear prediction on the energy needed to attain the thermal comfort condition. This project is about the thermal design of walls for optimum energy performance for low-rise residential building via computer simulation using Energy-10. (Massimo Colombari, 1999)