

論文審査の要旨
Summary of Dissertation Review

博士の専攻分野の名称 Degree	博 士 (工 学)	氏名 Author	MUHAMMAD NUR FAJRI ALFATA
学位授与の要件	学位規則第4条第①・2項該当		
論 文 題 目 Title of Dissertation Fundamental Study on Indoor Thermal Environments in High-Rise Apartments in Hot-Humid Climates of Indonesia			
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〔論文審査の要旨〕 Summary of Dissertation Review			
<p>The main objective of this study is to provide fundamental and comprehensive data on thermal environments in newly constructed high-rise apartments of Indonesia, which is the so-called <i>Rusunami</i>. The obtained data and information would be useful in developing new energy-saving guidelines and standards for these apartments. Indonesia has been experiencing stable economic growth over the last few decades and the middle class is now on the rise particularly in major cities, such as Jakarta, Surabaya and Bandung. In order to accommodate the growing number of urban middle class people, the Indonesian government is promoting high-rise apartments, i.e. <i>Rusunami</i>, such as those under the national project of the so-called “1000 tower project”. However, these newly developed high-rise apartments do not consider energy-saving and tend to be designed on the premise of fully making use of air conditioning. The findings of this study are expected to provide useful and practical knowledge in designing guidelines for the high-rise apartments to be more energy efficient in terms of space cooling, while achieving indoor thermal comfort.</p> <p>The thesis is composed of seven chapters. After giving the introduction (Ch. 1) and the literature review (Ch. 2), the current indoor thermal conditions in existing apartments of Indonesia are investigated in detail through field measurements as well as numerical simulations in Ch. 3. The investigations deal with not only unoccupied units but also occupied units, and the major factors affecting the indoor thermal conditions are analyzed. Ch. 4 shows the results of field measurements conducted in several Dutch colonial buildings located in the city of Bandung. Several passive cooling techniques embedded in the traditional buildings are extracted. In Ch. 5, a parametric study through the CFD analysis is conducted to optimize the unit design of a typical high-rise apartment. The effects of natural ventilation, thermal mass, area of openings, thermal insulation, and ceiling height are examined in this study. In Ch. 6, design guidelines for the high-rise apartments are proposed based on the results of the analyses. Ch. 7 summarizes the key findings from the respective chapters as conclusions, followed by the discussion on future studies.</p> <p>The candidate has published two refereed journal papers, two book chapters in an international publisher and two refereed conference papers, and presented two papers in conferences. Thus, the committee has confirmed that the candidate has the sufficient capability for awarding the Doctoral Degree in Engineering by IDEC, Hiroshima University.</p>			