



Available online at www.sciencedirect.com

ScienceDirect

Energy Procedia 122 (2017) 991–996

Energy

Procedia

www.elsevier.com/locate/procedia

CISBAT 2017 International Conference – Future Buildings & Districts – Energy Efficiency from Nano to Urban Scale, CISBAT 2017 6-8 September 2017, Lausanne, Switzerland

Development of window design guideline and tools for early stage decision support

Ji Hyun Oh^a, Jae Eun Sung^a, Sun Sook Kim^{a*}

^a*Department of Architecture, Ajou University, Suwon 16499, South Korea*

Abstract

As building envelope design influences the appearance of a building, various alternatives are suggested during the early stages of designing the building. Windows greatly affect the energy performance of the building and also the comfort of the occupants. Therefore, in an attempt toward making the window design information readily available, many countries have developed and distributed guidelines with formats varying in terms of their contents and purposes. The aim of this study is to present the development process of a window design guideline and the tools for various climatic conditions. Based on preceding research, the guideline prepared in this work has three parts: a downloadable document file, a webpage and a stand-alone program. This guideline can be used as a decision support tool by architecture professionals in the early stages of window design. We intend to present this guideline to government institutions to help shape policies on building design.

© 2017 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the scientific committee of the CISBAT 2017 International Conference – Future Buildings & Districts – Energy Efficiency from Nano to Urban Scale

Keywords: Building energy, Window design, Guideline, Early stage decision support

* Corresponding author. Tel.: +82-31-219-3571; fax: +82-31-219-6498.

E-mail address: kss@ajou.ac.kr

1. Introduction

As the building envelope design influences the appearance of a building, various alternatives are suggested during the early design stage. Windows have a great influence on the energy performance of buildings and on the comfort of the occupants. As a result, both their aesthetic features and energy performances need to be considered during the design stage. In this context, many international guidelines and tools on window design, which help make decisions during the early stages, have been developed and distributed. For these decisions, the architects need to acquire an understanding of several window parameters [1]. If certain building regulations impose restrictions in terms of their performance, these guidelines provide the information required by the users to ensure building efficiency [2]. Therefore, it is crucial that reliable and accurate information in the guideline is conveyed to the users effectively. Guidelines are generally presented as printed books and downloadable document files. They include an introduction on window design parameters and advanced technologies for high-performance windows, and also the effect that changing one or multiple parameters can have on energy consumption or comfort. On the other hand, tools have advantages over documents, as far as visualization and understanding the effects of changing multiple parameters from a user's perspective are concerned. Tools can be distributed among webpages or can have a stand-alone format.

The Korean government developed “The window design guideline for building energy conservation” in 2012 to support the architects [3]. This guideline includes information on policies, parameters related to window design, and also results from office building perimeter zone simulations, considering weather, orientation, glazing type, window to wall ratio, lighting control and shading devices. Although useful, this guideline has limitations, specifically when the users want to compare several alternatives for changes in multiple parameters. Besides, since a guideline has been published, it is not updated for latest developments. Therefore, there is a need to improve guidelines based on user requirements. This study investigates the development process of window design guidelines and tools to help architects make early design decisions in Korea. In order to achieve this, three main steps were carried out: 1) a questionnaire survey with architectural professionals as participants, 2) literature review, 3) and an investigation on the state of the art buildings in Korea, as shown in Fig.1. Based on these steps, we derived the development strategies and details required for preparing a guideline, which are described in section 2. Finally, section 3 provides details on the construction of the guideline, including one guideline document and two tools.

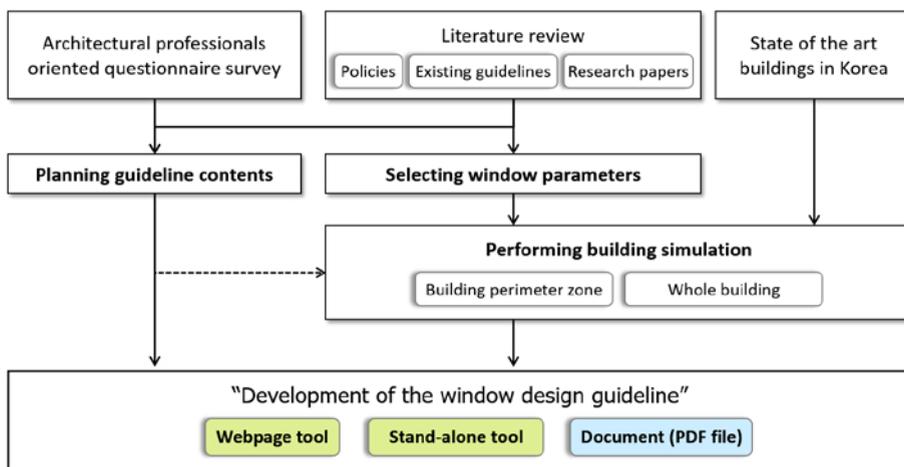


Fig. 1. Research process

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات