

Trial Version of a Systematic Material Selection Tool in Building Element Design

Authors : Mine Koyaz, M. Cem Altun

Abstract : Selection of the materials satisfying the expected performances is significantly important for any design. Today, with the constantly evolving and developing technologies, the material options are so wide that the necessity of the use of some support tools in the selection process is arising. Therefore, as a sub process of building element design, a systematic material selection tool is developed, that defines four main steps of the material selection; definition, research, comparison and decision. The main purpose of the tool is being an educational instrument that would show a methodic way of material selection in architectural detailing for the use of architecture students. The tool predefines the possible uses of various material databases and other sources of information on material properties. Hence, it is to be used as a guidance for designers, especially with a limited material knowledge and experience. The material selection tool not only embraces technical properties of materials related with building elements' functional requirements, but also its sensual properties related with the identity of design and its environmental impacts with respect to the sustainability of the design. The method followed in the development of the tool has two main sections; first the examination and application of the existing methods and second the development of trial versions and their applications. Within the scope of the existing methods; design support tools, methodic approaches for the building element design and material selection process, material properties, material databases, methodic approaches for the decision making process are examined. The existing methods are applied by architecture students and newly graduate architects through different design problems. With respect to the results of these applications, strong and weak sides of the existing material selection tools are presented. A main flow chart of the material selection tool has been developed with the objective to apply the strong aspects of the existing methods and develop their weak sides. Through different stages, a different aspect of the material selection process is investigated and the tool took its final form. Systematic material selection tool, within the building element design process, guides the users with a minimum background information, to practically and accurately determine the ideal material that is to be chosen, satisfying the needs of their design. The tool has a flexible structure that answers different needs of different designs and designers. The trial version issued in this paper shows one of the paths that could be followed and illustrates its application over a design problem.

Keywords : architectural education, building element design, material selection tool, systematic approach

Conference Title : ICBMC 2017 : International Conference on Building Materials and Components

Conference Location : Paris, France

Conference Dates : May 18-19, 2017