

Effect of Kinetic Shading Elements on Energy Performance

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Abstract

Energy efficient structure design is critical issue because of increasing needs for energy and the depletion of energy sources. Building envelope has the largest surface connected to the external environment. It is the surface where most energy loss occurs in the structure. Therefore, minimize energy loss in the building envelope measures have to be taken. The sun rays come to earth on different angles at different times. When the structure receives the rays it shows sometimes positive but often negative reactions. It is important to take advantage of the right angle at the right time.

Especially in office buildings, due to the computer works and people activities, the effect of sun rays increase the indoor temperature that increase the cooling requirement during summer. Different façade systems as adaptable façade, kinetic façade and dynamic façade are used to reduce the increased cooling energy. Although these systems have similar properties their use on the façade is different. The purpose of kinetic facade systems is design to minimize the energy expenditure of the building without concession user comfort. There are many programs that analyze the energies using by buildings. One of these programs DesignBuilder. The program is typically established around Energy Plus, enabling the input of glazing and building datum of Energy plus, building models for energy simulations, and allowing conformity with UK's energy certificates and analyzing of different design parameters. It's also mentioned that DesignBuilder can performance many environmental and lighting simulation and analysis.

In this study, it is aimed to calculate how reduce heating, cooling and lighting energy by using DesignBuilder. In addition to energy performance of kinetic façade system is searched. Energy analysis is done by entering the building parameters in the program. It is determined that how much the energy saving will by using kinetic facade elements. The result of this research shows how much energy saving could be achieved by using kinetic facade elements.

Keywords: Kinetic Shading Systems, Energy Performance, DesignBuilder