



10th International Conference Interdisciplinarity in Engineering, INTER-ENG 2016

Study on the Influence of Solar Contributions on the Total Energy Consumption for an Education Building

Paraschiva Mizgan^{a*}, Ioan Lucian Cirstolovean^a, Florin-Lucian Tamas^a, Radu Muntean^a,
Christiana Cazacu^a

^a*Transylvania University of Brasov, B-dul Eroilor nr. 29, Brasov, 500036, Romania*

Abstract

Since with the majority of educational buildings the glass area surface is generally bigger than in the rest of civilian buildings, the authors presented in the paper a case study on the influence of this area on the energy performance of an educational building by a comparative analysis of the annual energy consumption, taking into consideration the following parameters: the cardinal orientation of the building, its thermal compliance and its type and the quality of the glazing. For the research carried out in this paper, we had as support for the study the building of the Civil Engineering Faculty in Brasov, a building with a height regime of B (basement) + GF (ground floor) + 7F (floors).

© 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of INTER-ENG 2016

Keywords: Efficiency; consumption; solar contributions; glazed surface; thermal compliance.

1. Introduction

Given the fact that the energy efficiency of buildings has a prominent place in the agenda of the international communities, the identification of some design solutions by the promotion of solar architecture which might lead to reduced annual energy consumption is a priority.

Taking into consideration the fact that for the majority of educational buildings, the surface of the glazed area is much bigger than in the rest of the civilian buildings, the authors presented in the paper a case study on the influence of this area on the energy performance of an educational building located in Brasov, by analyzing the annual energy consumption taking into consideration the solar contributions depending on the building orientation in relation to the

* Corresponding author. Tel.: +40-740-133548.
E-mail address: paraschiva.mizgan@unitbv.ro

cardinal points, the thermal compliance, the ratio between the opaque surface and the glazed surface and its type and the quality of the glazing.

The research carried out in the paper, having as support of the study the building of the Civil Engineering Faculty in Brasov, a building with a height regime of B + GF + 7F, was conducted as follows:

- Stage I: the comparative analysis of the annual energy consumption, by considering five possible cardinal orientation variants of the building, namely: the current situation, with the long axis of the building oriented N-S and other four possible cardinal orientation variants obtained by the hypothetical rotation of the building clockwise (from 45° to 45°) for a total angle of 180° ;
- Stage II: the analysis of the annual energy consumption, by considering the current cardinal orientation of the building, but taking into consideration for the comparative study, three structural composition variants of the glazed area, namely: the current variant, metal profiles and common glass, the second variant with PVC profile carpentry and insulated double glass and the third variant, when the carpentry is made of PVC profile and triple insulating glass.

2. Materials and methods

2.1. General data on the analyzed building

- Second category educational building, with intermittent occupancy, and average inertia;
- The height regime is B + GF + 7F and the plan dimensions of the building are: 43.70 m x 15.70 m, with the long axis of the building oriented N – S, as presented in Fig. 1;

For the comparative analysis proposed for this paper, it is necessary to quantify the value of the heat of the branch, (Q_{inc}^{an})

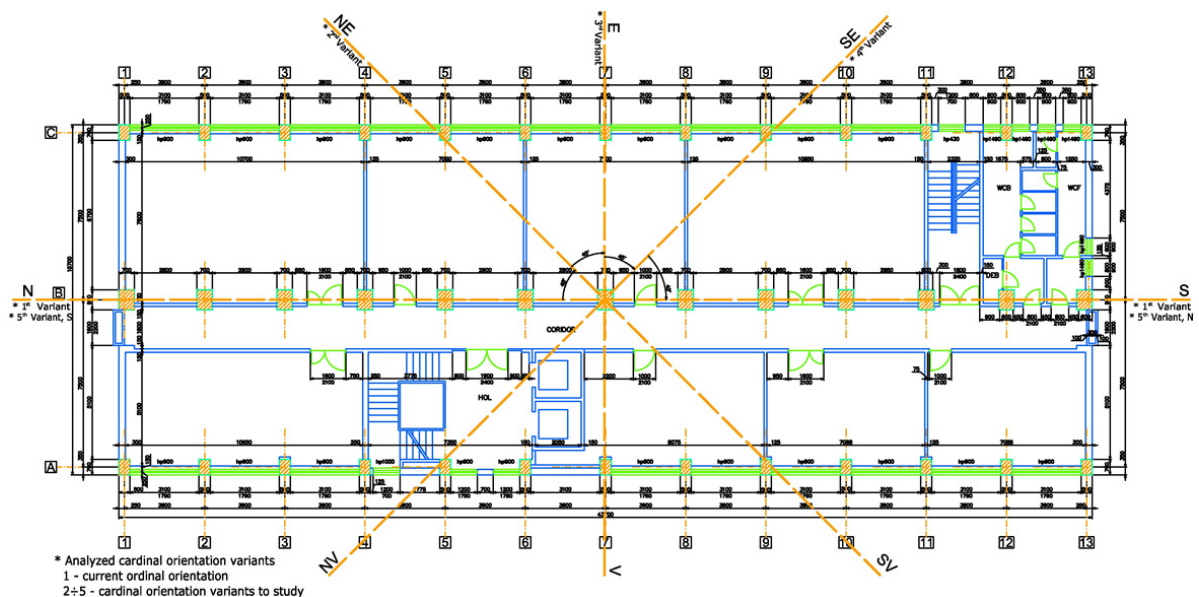


Fig. 1. Ground floor of the building and cardinal orientation variants for study.

- The resistance structure is of the reinforced concrete frames type, reinforced concrete floors, terrace roof, brick masonry for closing walls and partitions;

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