

Екологічна оцінка будівництва відповідно до BEAS

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Екологічна оцінка будівництва – це комплекс процесів, спрямованих на систематичну і об'єктивну оцінку виконання будівництва. Сфера екологічної оцінки будівництва дуже динамічно розвинулася за короткий період з часу введення методу BREEAM. Протягом минулих тринадцяти років спостерігалось швидке зростання кількості методів екологічної оцінки будівництва, що використовуються по всьому світу.

Метою оцінки будівництва є визначення дійсного стану будівництва з точки зору безпеки і надійності, порівняння об'єктів будівництва, з'ясування впливу екологічного потенціалу споруд і можливостей, які виникають у зв'язку з постійним процесом будівництва.

В останніх роках оцінка будівництва під оглядом екологічного, соціального і культурного аспектів стала дуже актуальним і широко обговорюваним питанням в Республіці Словаччини. Нова система екологічної оцінки будівництва була розроблена Інститутом інженерії середовища Технічного університету м. Кошице. Системи і інструменти, які використовуються в багатьох країнах, були основою для розробки системи для використання в словацьких умовах. У роботі запропоновано головні галузі і відповідні показники екологічної оцінки будівництва, які були розроблені на основі інформаційного аналізу відповідних сфер будівництва, а також відповідно до результатів наших експериментальних досліджень. Розробка системи головною мірою покладалася на програму SBTool. BEAS – це система з багатьма критеріями, яка включає також екологічні, соціальні і культурні аспекти. Запропоновані сфери і показники відповідають стандартам, правилам, дослідженням і експериментам, проведеним у Словаччині.

У роботі представлено систему BEAS, яка може використовуватися в умовах Республіки Словаччини. В дослідженні наведено також процес розвитку системи екологічної оцінки будівництва з метою полегшення процесу його розробки. Запропонована система екологічної оцінки будівництва, яка стосується словацьких умов, складається з 6 головних сфер і 52 відповідних показників.

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Building environmental assessment according to BEAS

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Building environmental assessment is a specific complex of proceedings oriented towards systematic and objective evaluation of a building's performance. These processes lead to the design, construction and operation of buildings with respect to criteria for sustainable development. In the recent years the evaluation of building performance in terms of environmental, social and economic aspects is a discussed topic in the Slovak republic. The purposes of building assessments from these aspects are due to the determination of real building states from a safety and reliability point of view, the possibility of building comparisons, the effect of environmental buildings potential and the proposal of measures resulting in sustainable buildings. In Slovakia the building environmental assessment system (BEAS) has been developed at the Institute of Environmental Engineering, Technical University of Košice. The proposal of BEAS applicable in condition of Slovak Republic will be presented in this paper. The paper also presents the evaluation of selected office buildings in the phase of their conceptual design.

Keywords – building environmental assessment, sustainable building, system, method, tool.

I. Introduction

Due to an increasing awareness of the effects of the contemporary development model on climate change and the growing international movement towards high performance buildings, the current paradigm of building is changing rapidly. Such change is affecting both the nature of the built environment as well the actual method of designing and constructing a facility. This newly emerging approach differs from established practice in the following important ways: by selecting project team members on the basis of their eco-efficient and sustainable building expertise; increased collaboration among the project team members and other stakeholders; greater focus on global building performance than on building systems; a strong emphasis on environmental protection for the whole life-cycle of a building; careful consideration of worker health and occupant health and comfort throughout all phases; scrutiny of all decisions for their resource and life-cycle implications; the added requirement of building commissioning, and a real emphasis on reducing construction and demolition waste [1, 2]. The field of building environmental assessment has matured remarkably quickly since the introduction of BREEAM, and the past thirteen years have witnessed a rapid increase in the number of building environmental assessment methods in use world-wide [3]. These tools have been developed by various institutes [4].

II. Building Environmental Assessment in Slovakia

In the recent years the evaluation of building performance in terms of environmental, social and cultural aspects is a discussed topic in the Slovak republic. The new building environmental assessment system has been developed at the Institute of Building and Environmental Engineering, at the Technical University of Kosice. The systems and tools used in many countries were based on the new system development for applications under Slovak conditions. The main fields and relevant indicators of building environmental assessment were proposed on the basis of available information analysis from particular fields of the building performance and also according to our experimental experiences. The foundation of system development was mainly based on the SBTool. BEAS is a multi-criteria system which included environmental, social and cultural aspects. The proposed fields and indicators respected and adhered to Slovak standards, rules, studies and experiments [3]. In the Table 1 is shown developed building environmental assessment system for Slovak.

Table 1

PROPOSED FIELD AND SUB-FIELDS IN BEAS

Fields, sub-fields and indicators	Weihts [%]
A Site Selection an Project Planning	21.34
A1 Site selection	
A2 Site developmnet	
B Building Construction	14.54
B1 Materials	
B2 LCA	
C Indoor Environment	22.52
D Energy Performance	27.84
D1 Operation Energy	
D2 Renewable energy sources	
D3 Energy Management	
E Water Management	7.80
F Waste Manage-ment	5.97

Each main field has several indicators which have the intent of assessment and the scale of assessment. Result of each indicator is obtained so that the point from scale is multiplying with weight of indicator. To support BEAS a software tool enabling comprehensive evaluation of buildings was developed.

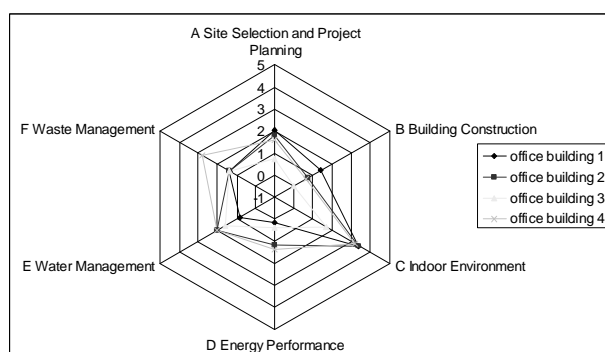


Fig. 1. Results of office buildings assessmen

III. Office buildings assessment

Four office buildings located in the east of Slovakia were selected for the system verification. In the Figure 1 are shown results from buildings evaluation and a total score of assessment for each main field. Office building are located in Košice and were assessed by system BEAS. The field “Site selection and project planning” obtained average value of 1.54; “Building construction” value of 0.69; “Indoor Environment” value of 2.93; “Energy performance” value of 0.77; “Water management” value of 1.60 and field “Waste management” value of 1.73. The total weighted building score is 1.53 which is classified as Environmentally acceptable building. The results from the comprehensive environmental assessment of selected offices it can assert, that it is necessary to propose measures to improve the environmental suitability and safety of the evaluated office buildings in all assessed fields.

Conclusion

This paper presents the development of a building environmental assessment methodology and system that is intended to assist the design process. The proposed environmental assessment system of buildings applicable in Slovak conditions consists of 6 main fields and 52 relevant indicators. The basis of system development consists of systems and methods used in many countries, especially SBTool. The main fields are building site and project planning, building constructions, indoor environment, energy performance, water management and waste management. The proposed fields and indicators respect Slovak standards, rules, studies and experiments. The weighting coefficients were developed to suit local conditions such as climate or to reflect the prioritized policies and will be modified for various type of buildings. This paper introduced a comprehensive method of identifying indicators for assessment in office buildings applying feasibility, completeness, effectiveness and multi-attribute decision making rules.

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