

## Different Approach of the Construction Sustainability

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### Abstract

The paper presents a new approach for obtaining the sustainability of the construction works. The application of the sustainability aspects is presented on two different types of constructions.

The **first application** considers into account the analysis of a multi-store structure. The structure is made of three different types of structural elements: R.C. structure, Steel structure and Masonry structure. The parameters for the sustainability approach were: energy consumption, direct cost, manpower and horizontal capacity force.

The **second study** shows the sustainability of a structural and hydrothermal rehabilitation intervention on a historical building. The analysis will refer at three situations of the building: initial state; the common methods for insulating layer, the innovative solution with aired layer between the heat insulating and the masonry.

**Keywords:** building sustainability; specific model; sustainability index; sustainability cost; multi-store structure; hydrothermal rehabilitation; R.C. structure; steel structure; masonry structure.

### 1. The building sustainability

Most of the existing models which evaluate the sustainability performances of construction works are very comprehensive and with high applicability, like: BREEM, LEED, CASBEE, DGNB, SB Tool, Green Star, HK-BEAM, EN 15643-1, ISO and so on [1], [2], [3].

In many cases such models show some disadvantages: any of models do not cover all three dimensions; they include a great number of criteria and many of them are difficult or impossible to quantify; the tools are focused mainly on entire buildings, and they can be applied with some difficulties on other types of construction works and activities.

To avoid disadvantages, the author and his collaborators had proposed a new assessment method, called specific model [1]. The main advantages of this method are covering the three dimensions of sustainability; high degree of applicability; includes only quantitative parameters.

The new approach, presented in this paper, is based on the specific model but instead of the calculation of **the sustainability index SI** the evaluation considers the price of each parameter of the tree dimensions and finally **the sustainability cost SC** is obtained [4], [5], [8].

#### 1.1 Specific model

The specific model is based on simple mathematical equations, which combine the results of the quantified parameters in a rational way, obtaining finally a Sustainability Index SI:

$$SI = S_{env} + S_{eco} + S_{soc} \quad (1)$$

$$S_{env} = \sum_{i=1}^n \alpha_i \times \frac{P_{i,env}^R}{P_{i,env}}; \quad S_{eco} = \sum_{i=1}^n \beta_i \times \frac{P_{i,eco}^R}{P_{i,eco}}; \quad S_{soc} = \sum_{i=1}^n \gamma_i \times \frac{P_{i,soc}^R}{P_{i,soc}} \quad (2)$$

Where: