

## Cost Budget and Cost Control Analysis of New Green Building Projects

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**Abstract:** With the development of green building ecology, the use of new green building materials has become a cutting-edge architectural means. But different green environmental protection materials have special properties of cost. Therefore, this paper puts forward the analysis method of the impact of new green building materials on the cost management of construction projects. The green building residential area project controls the incremental construction through optimized design. The goal of low building operation energy consumption under ideal condition is achieved with low construction cost increment. Under the premise of ensuring good living comfort, the resources and energy consumption in the whole life cycle of the building are reduced, and the short-term recovery of the green building cost increment is realized. The box cover method is used to solve the cost distribution probability, and the cost is quantified. The special properties of building materials are described effectively, and the utilization of new green environmental protection building materials is studied combined with the cost analysis results. The actual situation of different ecological landscape space planning in different cost areas is described. The influence of the cost of different building materials is reflected, thus obtaining the binding influence relationship between building materials and cost.

### 1. Introduction

Project cost is affected by many factors [1]. The use of building materials in natural geographical conditions is the basic unit [2]. The change of different building materials will have a direct impact on the cost of the project [3-5]. Among them, the use of green materials will also have a significant impact on the project cost, which is also one of the factors affecting the cost changes and formation [6]. In the process of improving building quality and reducing resources and energy consumption, green building construction will bring a certain increase in construction cost [7]. However, under certain conditions of environmental comfort, it can greatly save the cost of building operation [8]. Many scholars and environmentalists have been studying the issue of building materials change for many years [9]. All along, the parameters of building materials are generally used to describe and express the cost, such as green building materials, environmental protection building materials and so on [10]. Saving resources, energy and efficient utilization of resources and energy is the core of green building. Green building construction should not only improve the efficiency of resources and energy utilization, but also consider the cost and benefits of various green building technologies.

### 2. Analysis on the Present Situation of the Cost Budget of New Green Building Project

Cost budget and cost control are fundamental to green building projects. In order to better develop green buildings, reducing engineering costs and improving economic efficiency. Many construction units of new green construction projects are not aware of the importance of cost budget management. Their main concern is still the progress of construction and the quality of construction, so that when the sudden situation occurs, the whole project will become chaotic. In the cost budget and cost control, the most obvious change is the diversification of management and control. Compared with the previous buildings, new green buildings have higher requirements for construction. Because it

involves environmental protection, we need to consider more aspects, and the factors that will affect the construction and the objectives we need to control in construction will be very complicated. Therefore, it is easy to have omissions and incomplete problems in the later stage of statistical data.

In the green building and building energy efficiency design, several common external wall insulation practices in southern China are analyzed by computer simulation (see Table 1). It can be seen that after the aerated concrete block is used on the exterior wall, no additional insulation measures should be adopted.

Table 1 The thickness of several external insulation materials needed for different external wall materials to achieve the same heat transfer coefficient values

Outer wall main material		Thermal insulation material (thickness mm)		
Material name	Thickness (mm)	Foam glass	Polystyrene particle insulation mortar	Expansion vitrified microbead inorganic thermal insulation mortar
700 bulk density of aerated concrete block	150	5	5	5
Clay hollow block	200	15	30	25
Porous brick of sintered shale	230	25	15	30
Ceramsite concrete hollow block	170	30	35	28

The new green building covers a larger area, the construction cost is higher, and there are more strict requirements in the construction of many details, and some special construction methods will appear according to the requirements of different construction. Adopting the scientific cost budget calculation method can make the cost budget and the actual situation as close as possible. In the design of building ventilation and lighting, it will be adjusted according to the type, quantity, distribution mode and surrounding natural environment of plants around the building. The construction investigation report of the construction project is completed, and the material price, material specification and overall structure of the new green building project are understood through a variety of methods such as online survey and market investigation.

As shown in Figures 1 and 2, the actual landscape types are compared with the landscape distribution within the constraints, as shown in the illustration.

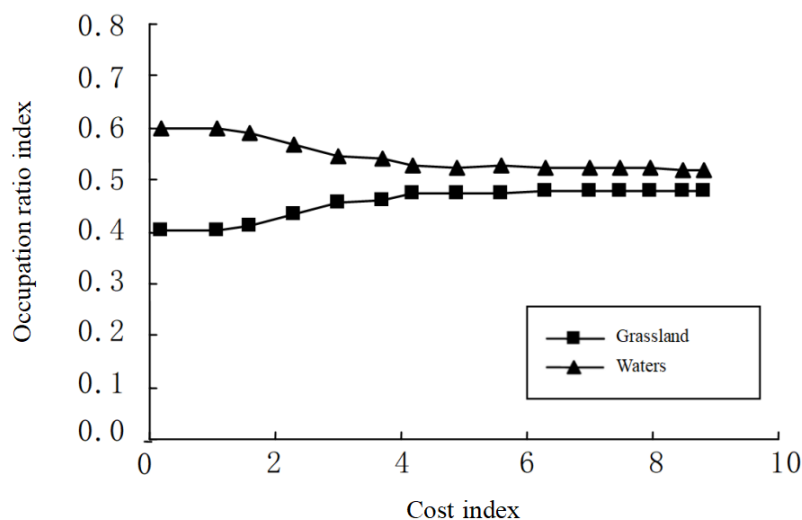


Figure 1 Distribution of landscape layout of different constraints cost 1

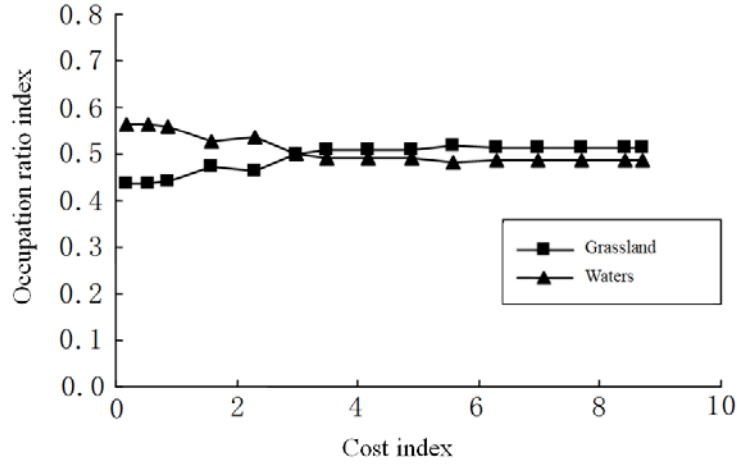


Figure 2 Distribution of landscape layout of different constraints cost 2

$$w(t) = w_2 + (w_1 - w_2) \frac{T - t}{T} \quad (1)$$

In type: the use area of building materials is expressed by  $w_2$ . The number of all environmental building materials in the building pattern is indicated by  $t$ . The total area is represented by  $T$ .

$$p = \begin{cases} k & \sigma^2 < \sigma_d^2, f(P_g^t) > f_d \\ 0 & \end{cases} \quad (2)$$

The project cost diversity index is expressed by  $P$ . The number of building materials for type  $k$  project cost type is expressed by  $f$ .

$$f(x) = \text{sign}[\omega^T x + b] \quad (3)$$

In the formula: the relative evenness index is expressed by  $f$ . The diversity index is expressed by  $\text{sign}$ . The maximum evenness index of the project cost is expressed by  $b$ .

At present, green buildings are divided into three types: energy conservation, emission reduction, technology exploration and demonstration research. These three types are increasing in the required cost. The observation and mastery of the building materials market is the compilation of the cost budget from the macroscopic supervision, and the new green building project is just like the general construction project. Its budget management is never a fixed number, with the periodic change of green building and the change of the social environment, it has the characteristics of periodicity and stage. In the application of green building, energy saving, emission reduction, energy recycling and environmental protection are the core of green building. The main contents of green building are building energy efficiency design, renewable energy utilization, and ensuring that the surrounding environment of buildings is not damaged. Targeted solutions should be taken to keep track of the price changes of construction materials and the budgetary changes of the whole project. Minimize the error between budget and actual cost.

Table 2 Actual survey of land use cost index

Slope	0 ~8 (Degree)	8 ~16 (Degree)	16 ~30 (Degree)
Fractal dimension	2.36	1.90	1.75
Dominance index	2.12	2.59	2.74
Evenness index	1.56	1.68	1.48
Diversity coefficient	3.52	2.31	1.68
Fragmentation index	40.23	90.12	95.67

By observing the data of Table 2, we can see that the cost index obtained by the multi fractal

spectrum analysis method based on the mathematical model is basically the same as the cost index obtained by the actual survey.

### 3. Cost Control Analysis of New Green Building Project

The level of the modern construction enterprise is more, from the decision makers of the higher level to the decision, to the construction staff to receive the decision, it is necessary to pass a number of steps. Such inconvenience will delay the overall construction cost and delay the construction progress. The management mode of building engineering in China is a management mode of upper and lower level, which is very complicated and complicated in practical application. It should pay attention to safety and efficiency in construction. Construction workers do not have the sense of cost saving, and there is no environmental awareness of new green building projects. It is blindly carried out according to the construction drawings and will not pay attention to environmental protection when making independent choices. The relevant units will even ignore the environmental impact for the boundary of the project. These problems need to be repaired in the later stage, resulting in an increase in costs.

From the data provided in Table 3, it can be seen that the amount of mineral transfer in the rock mass is obviously greater than the amount of transfer after the experiment. The more mineral output indicates the greater the porosity of the rock mass, the more the more precipitate material is dissolved.

Table 3 Mineral conversion of sandstone samples

Mineral composition (mmol/L)	SY - A	SY - B	SY - C
Calcite	-324.2	120.6	105.9
Mica	-99.5	-101.5	-120.3
Chalcedony	-235.1	-201.3	-195.1
Dolomite	-50.3	-20.3	-20.4
Plagioclase	53.2	55.6	50.3

The management mode of many new green construction projects in China is the vertical internal cost management, which is more complicated and the "flat" of the management mechanism is a trend. "Flat" can enable cost control information to be transmitted to cost managers as soon as possible. In actual construction, the guarantee of construction period, quality and safety is also a way of cost control. In the management of construction enterprises, the failure of contract management may cause the enterprises to suffer economic losses and make construction safety hidden trouble. During construction, any construction quality is not up to standard, which will have an impact on the whole construction schedule. In severe cases, it will lead to the rework of the project, which will directly increase the economic cost of the project. If a serious quality safety accident occurs, it will even cause a downtime, which will cause huge economic losses to the construction unit. In order to shorten the construction period, the consumption of mechanical equipment will be reduced, the service life of mechanical equipment will be reduced, and the engineering cost will be increased.

$$D_i = a + \sum_{j=1}^n b_j p_j + r_i Y + u \quad (4)$$

The project cost diversity index is expressed by  $D$ . The number of elements of the project cost element is expressed by  $a$ . Class  $j$  project cost occupied area ratio is expressed by  $b_j$ .

$$HWt = \frac{\sum_{i=1}^N D_i(x)}{N} \quad (5)$$

Type: a certain type of engineering cost building material quantity is represented by  $HWt$ . The area

of the project cost element is expressed by  $D$ . The fragmentation index is expressed by  $N$ .

In the cost control of new green building projects, materials account for 65% to 75% of the cost. The use of materials is largely to the root of cost control. Targeted solutions should be taken to keep track of the price changes of construction materials and the cost changes of the whole project. When carrying out construction materials, green construction should be carried out in a resource conserving manner. Under the premise of ensuring the quality and safety of the project, we should save material resources through scientific management methods and superior technology. At the same time, in the whole project, many materials can be reused. Some of the remaining materials can be applied to other parts, making full use of materials and maximizing the use of materials. A systematic and scientific assessment system will allow cost efficiency to be brought into full play, and the management responsibility and task of cost control can be carried out to every department and staff in the enterprise. Green building is a kind of system engineering. When cost control reaches the requirement, it must understand the project thoroughly.

#### 4. Conclusion

By improving the ability and quality of the staff, improving the calculation method of the cost budget, and the observation and mastery of the building materials market, the cost budget of the new green construction project can be made more accurate. Through the improvement of management system, the strengthening of contract management and the introduction of advanced technology, the cost control ability of new green building projects can be strengthened. According to the different types of green building projects, we have a comprehensive understanding of the building and a clear understanding of its function. In order to effectively control the impact of human activities on the ecological environment, and to study the impact of the use of energy saving and environmental building materials on the cost, a multifractal spectrum analysis method based on mathematical model is proposed. In the cost budget and cost control of the new green building project, we should not only consider the problems in an all-round way, but also learn advanced methods to improve the effect, and do a good job of saving the resources.

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