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Green Buildings Life Cycle Cost Analysis and Life Cycle Budget Development: Practical Applications

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Abstract

Life cycle costing is gaining considerable attention particularly within the context of sustainable construction. However, the application of life cycle costing in the construction sectors is still limited and facing practical problems. Imperfect understanding of life cycle costing methodology and application is considered one of the key barriers to a widespread application of life cycle costing in the construction industry. This paper presents a study that demonstrates how the life cycle cost analysis was conducted for a green building and shows how the life cycle cost variables were identified and used to develop a life cycle budget for the whole life cycle of a green building which extends for 60 years. It is found in this research that the future costs of the investigated green building are around 3.6 times as high as its initial design and construction costs. Not surprisingly, the energy cost constitutes a weight of 48% of the total life cycle budget for the building, and this ratio goes above 60% when weighted against building operating costs only. It is also found that reduced energy consumption in the green building is the most influential factor to reduce its total life cycle cost.

Keywords: *Construction sector; life cycle costing; life cycle budget; energy cost; green buildings*

1 Introduction

More pressure is being exercised on the construction industry to take into account future running costs associated with a building which are typically assessed using life cycle costing as a cost evaluation technique [1–3]. Within the context of the built environment, life cycle costing is a method used to assess the anticipated economic performance of a building throughout its life cycle which includes: design and construction, operation and maintenance, in addition to disposal [1,4]. Yet, in the construction sector, the application of life cycle costing is still limited and facing practical problems [2,5]. Issues related to poor perception of life cycle cost benefits by building owners, lack of reliable life cycle cost input data, shortage of actual cost and performance information about buildings in use, uncertainty associated with life cycle cost assumptions [1,2,5], in addition to imperfect understanding of life cycle costing methodology and application are considered key barriers to a widespread application of life cycle costing in the construction sector [2,4,6].

The aim of this paper is to improve the understanding of life cycle costing application in the construction industry by providing a detailed description about the process used in developing a life cycle budget for a green building throughout its whole life cycle. The paper also provides a breakdown for the weights of different life

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