

**LIFE CYCLE COSTING OF INDUSTRIALIZED BUILDING SYSTEM AND  
CONVENTIONAL BUILDING SYSTEM**

**ALI MOHAMMED ALI NAJI AL-ATTABI**

**UNIVERSITI TEKNOLOGI MALAYSIA**

LIFE CYCLE COSTING OF INDUSTRIALIZED BUILDING SYSTEM AND  
CONVENTIONAL BUILDING SYSTEM

ALI MOHAMMED ALI NAJI AL-ATTABI

A project report submitted in partial fulfilment of the  
requirements for the award of the degree of  
Master of Science (Construction Management)

Faculty of Civil Engineering  
Universiti Teknologi Malaysia

JUNE 2014

To my beloved family

## ACKNOWLEDGEMENT

I would like to express my deepest appreciation to all those who provided me the possibility to complete this project report. I would like to express my special appreciation and my thanks to my supervisor, Assoc. Prof Dr. Abdul Kadir Marsono. You have been a tremendous advisor for me. I would like to thank you for encouraging my research and your endless support, which is priceless.

I would also like to thank my beloved wife for her continued support and encouragement during this long march. Your support is very appreciated.

Finally, my sincere appreciation extends to all my friends for their help and advice.

## ABSTRACT

Life cycle costing (LCC) is the process of identifying and documenting the initial cost and future cost of the project throughout the lifetime of the building. It is important in determining the design alternatives through analyzing the total cost of ownership over the life span of an asset. Lack of adaptation of the residents with the house design leads them to adjust the house to fit their needs. The aim of this study is to calculate the life cycle costing of the new project as well as the changes and modifications throughout assumed lifespan of two generations for conventional and industrialized building system houses. Furthermore, it also introduces an alternative design to suit the householder needs. To achieve the aims, a research questionnaire survey was distributed among householders to obtain the money spent on housing and the modifications that occurred in the house throughout their home occupation. Moreover, the Net Present Value (NPV) method was adopted to achieve the IBS life cycle costing. Besides, Auto CAD software use to draw different house layouts to fit the residents' requirements obtained from the questionnaire. However, the results showed that the modifications cost of a conventional house equal to 57% of house selling price and the LCC of the conventional building system equal to 67% of the IBS. The research shows that the IBS is a better method of construction as an alternative to a conventional building system.

## ABSTRAK

Kos Kitaran Hayat (LCC) adalah proses mengenal pasti dan mendokumentasikan kos permulaan dan kos masa depan projek itu sepanjang hayat bangunan. Penentuan alternatif reka bentuk melalui analisis jumlah kos pemilikan ke atas jangka hayat aset adalah penting. Kurangnya adaptasi daripada kemahuan penduduk kepada reka bentuk rumah menyebabkan mereka mengubahsuai rumah bagi memenuhi keperluan mereka. Tujuan kajian ini adalah untuk mengira kos kitaran hayat projek baru serta perubahan dan pengubahsuaian di sepanjang jangka hayat andaian bagi dua generasi sistem pembinaan konvensional dan perindustrian. Ia juga memperkenalkan reka bentuk alternatif untuk memenuhi keperluan isi rumah. Untuk mencapai matlamat, satu tinjauan telah dijalankan dengan mengedarkan soal selidik dalam kalangan pemilik rumah untuk mengetahui kos dibelanjakan untuk rumah dan pengubahsuaian yang berlaku dalam rumah sepanjang menduduki rumah mereka. Selain itu, Nilai Kini Bersih (NPV) telah digunakan untuk mencapai kos kitaran hayat IBS. Selain itu, perisian Autocad digunakan untuk melukis susun atur rumah yang berbeza untuk disesuaikan dengan keperluan penduduk yang diperolehi daripada soal selidik. Walaubagaimanapun, keputusan menunjukkan bahawa kos pengubahsuaian rumah konvensional bersamaan dengan 57% daripada harga jualan rumah dan LCC bagi sistem pembinaan konvensional adalah bersamaan dengan 67% daripada SPI. Kajian menunjukkan bahawa IBS adalah kaedah pembinaan yang lebih baik sebagai alternatif kepada sistem pembinaan konvensional.