AN ANALYTICAL STUDY OF EFFECTIVE FORMWORK SYSTEMS FOR HIGH-RISE BUILDING CONSTRUCTION IN SRI LANKA

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Department of Civil Engineering

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Dissertation submitted in partial fulfilment of the requirements for the degree Master of Science in Construction Project Management

Department of Civil Engineering

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Sri Lanka

January 2014
DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where acknowledgement is made in the text.

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The above candidate has carried out research for the Masters dissertation under my supervision.

Signature of the Supervisor:.................................Date:..........................

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ABSTRACT

Formwork system is the most important factor determining the project success especially, in high-rise building construction projects in terms of speed, quality cost and safety of the work as it accounts 40% of the total project cost of the structure. The contractor needs to complete the project in the shortest time possible as a means to minimise the cost and the clients wants the building to start the business as early as possible. The most effective way to speed up the works in high-rise buildings is to achieve a very short floor cycle to have the structure of typical floors completed in the shortest time. That directly depends on the selected formwork type for the particular construction project. Thus, appropriate selection of an effective formwork system is crucial factor in successfully completing any high-rise building project.

Two case studies were carried out to analyse the cost for different types of formwork: modern conventional method; semi-system formwork; and, Aluminium panel system formwork use in construction projects. Case study projects were selected among high-rise buildings projects more than 25 stories which are located in Colombo metropolitan in Sri Lanka. The results indicated that the cost of formwork does not directly affect to the total project cost but the type of formwork is highly affected to the total project cost especially, in high-rise building construction projects. Accordingly, the Aluminium panel system formwork reduces the project duration and hence, the total project cost and gives construction structure a very high quality finish though the Aluminium panel system is very expensive itself. Moreover, this study reveals most cost effective formwork system for high-rise buildings more than 25 stories is the Aluminium panel system comparatively. Thus, this outcome is useful to decision makers to select the most appropriate formwork system for high-rise building construction.

Keywords: Aluminium panel system, Conventional method, Cost effective, Floor cycle, Formwork system, High-rise building, Modern conventional method; Semi-system formwork
DEDICATION

I dedicate this dissertation to my dearest wife and children.....
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LIST OF ABBREVIATIONS

BOQ – Bill of Quantities
OSHA – Occupational Safety and Health Administration