STUDY ON VIABILITY OF ADOPTING POST TENSIONED SLAB CONSTRUCTION IN SRI LANKA

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Declaration

I declare that this is my own work and this thesis 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 the acknowledgement is made in the text.

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Abstract

This study was undertaken in two phases to identify the viability of adopting post- tensioned slab construction of multi-storied buildings in Sri Lanka.

The phase I comprises the questionnaire survey which dealt with the construction practices of multi-storied buildings in Sri Lanka including slab construction. The advantages, disadvantages and cost comparison were carried out for the reinforced concrete and post-tensioned concrete slabs.

Phase II covers two study parts; one is the work study and the other is designs. For the work study, three building projects were selected and their costs were analysed. It confirms that the main cost in a multi-storeyed building is attributable to the slab and beams. In the design study, designs were separately carried out for the conventional reinforced concrete beams and slab and post-tensioned slabs for three (03) live loads of 1.5 kN/m^2, 2.5 kN/m^2 and 5.0 kN/m^2. Their cost comparisons were carried out for different spans as well.

Results of phase I study shows 75% of the participants in the survey were having more than 10 years of experience in the construction/design fields and currently 63% of them belong to the private sector. 100% of the participants accepted that the main structural material frequently used in multi-storied buildings in Sri Lanka is reinforced concrete, and 81% accepted that the most costly super structure elements are beams and slabs. Advantages and disadvantages of the reinforced concrete as the structural material are discussed in detail in the report.

13% of the participants posses experience in designing of post-tensioned slabs. However, 94% do not have the experience in construction of post-tensioned slabs. But, some have physically seen post-tensioned slabs construction. 31% of the participants have idea on the cost saving between reinforced concrete and post-tensioned concrete slab. The main conclusion is post-tensioned slab construction is 25% to 35% cheaper than conventional slabs, but not suitable for small spans. Finally, 65% of the participants accepted that post-tensioned slabs in multi-storied building projects are viable in Sri Lanka.

Results of phase II study reveal that the post-tensioned slab is cost effective for spans greater than 6 metres irrespective of the live load applicable.

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List of Abbreviations

Abbreviation		Description
C1	-	Civil 1
CS	-	Conventional Slab
CGC	-	Centre of Gravity of Concrete
CGS	-	Centre of Gravity of Steel
CPD	-	Continuous Professional Development
GOSL	-	Government of Sri Lanka
LKR	-	Sri Lankan Rupees
PT	-	Post-Tensioned
RF	-	Reinforcement
STP	-	Sustainable Township Programme
%	-	Percentage
Sq.m	-	Square metre

List of Appendices