PROJECT MANAGEMENT STRATEGIES FOR OVERCOMING OPERATIONAL BARRIERS IN BORED PILING PROJECTS IN SRI LANKA

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Thesis/Dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Science in Project Management

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DECLARATION

I declare that this is my own work, that 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 that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person, except were acknowledged in the text.

Furthermore, I admire and acknowledge the immense contribution of my research supervisor, Ch.QS Indunil Seneviratne for his intellectual contribution to the effective completion of this research dissertation. I affirm that I will not publish any findings from this study without the name of my research supervisor as a contributing author, unless I have gotten explicit permission from my research supervisor.

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

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Gomes D.G.N.M Date

The above candidate has carried out research for the Master's Dissertation under my supervision.

..... ….....

Ch.QS Indunil Seneviratne Date

Dissertation Supervisor

DEDICATION

I dedicate this dissertation

To my beloved parents, and

Family members

For their immense love,

Endless support

And encouragement!

ACKNOWLEDGEMENT

This project would not have happened without the help and efforts of many people and institutions. I am most thankful to my supervisor, Ch.QS Mr. Indunil Seneviratne, for his valuable guidance, helpful feedback, and strong support.

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May this research play a key role in helping our construction industry improve piling practices in a sustainable manner.

ABSTRACT

PROJECT MANAGEMENT STRATEGIES FOR OVERCOMING OPERATIONAL BARRIERS IN BORED PILING PROJECTS IN SRI LANKA

This study develops a project management framework to mitigate operational barriers in Sri Lanka's bored piling industry. Employing a mixed-method approach, literature review, questionnaire survey of 45 practitioners, and four expert interviews; the research identified twenty-four operational barriers. Relative Importance Index analysis revealed three most critical: time restrictions due to residential proximity (RII=0.82), suboptimal drilling techniques (RII=0.78), and logistical challenges with oversized equipment (RII=0.76). Expert interviews contextualised these findings within Sri Lanka's volatile fuel prices, protracted governmental approvals, and problematic clay-based soils.

A four-stage framework integrating Lean Management, Six Sigma, Critical Path Method, and Kaizen was developed, encompassing: (1) root-cause diagnosis using Fishbone diagrams; (2) strategic alignment of PM methodologies to specific barriers; (3) implementation through stakeholder collaboration and real-time monitoring; and (4) evaluation via Pareto analysis. Case study application demonstrated significant improvements: Lean reduced material waste by 22 percent; Six Sigma decreased design flaws by 25 percent; and CPM increased on-time project completion by 35 percent. This research offers a scalable model for enhancing efficiency, reducing costs, and promoting sustainability in bored piling operations within Sri Lanka and comparable developing economies.

Key words - Project Management, Bored Piling, Operational Barriers, Sri Lanka, Framework

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LIST OF ABBREVIATIONS

Abbreviation	Description
ADB	Asian Development Bank
BIM	Building Information Modeling
BOQ	Bill of Quantities
CAGR	Compound Annual Growth Rate
CBSL	Central Bank of Sri Lanka
CCI	Chamber of Construction Industry (Sri Lanka)
CMP	Corrugated Metal Pipe
CPM	Critical Path Method
DMAIC	Define, Measure, Analyze, Improve, Control (Six Sigma framework)
GDP	Gross Domestic Product
GPR	Ground Penetrating Radar
ICTAD	Institute for Construction Training and Development (Sri Lanka)
CIDA	Construction Industry Development Authority
ISO	International Organization for Standardization
KPI	Key Performance Indicator
MN	Mega newton (unit of force; 1 MN = 1,000 kN)

MSE	Mechanical Specific Energy
MT	Metric Ton
NVQ	National Vocational Qualification
OHSAS	Occupational Health and Safety Assessment Series
PDA	Pile Dynamic Analyzer
PDCA	Plan-Do-Check-Act (Kaizen cycle)
PM	Project Management
PVT	Private (Limited Company designation in Sri Lanka)
QM	Quality Management
RII	Relative Importance Index
SCM	Supply Chain Management
SLT	Sri Lanka Telecom
SPM	Strategic Project Management

LIST OF APPENDICES

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