

**LEAN TOOLS TO MINIMIZE DELAYS IN HIGH-RISE
BUILDING CONSTRUCTION PROJECTS IN SRI
LANKA**

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

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DECLARATION

I hereby declare that this submission is my own work and that to the best of my knowledge, it contains neither materials previously published or written by another person nor material, to a substantial extent, has been accepted for the award of any degree or diploma of a university or other institute of higher studies, except where references are mentioned.

Further, I acknowledge the intellectual contribution of my research supervisor Dr. Tharusha Ranadewa for the successful completion of this research dissertation. I affirm that I will not make any publication from this research without the name of my research supervisor as contributing author unless otherwise, I have obtained written consent from my research supervisor.

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(Dr. Tharusha Ranadewa)

Date: 02/07/2024

ABSTRACT

LEAN TOOLS TO MINIMIZE DELAYS IN HIGH-RISE BUILDING CONSTRUCTION PROJECTS IN SRI LANKA

The high-rise building construction with traditional approaches have been creating several issues to the Sri Lankan construction industry. Out of the many problems the projects faced, delays can be considered as the most vulnerable issues among high-rise building projects. Though lean can be considered as one of the most important tools to be used to minimise delays, there is lack of research on this area. Therefore, this research proposes the lean tools to minimise delays in high-rise building construction projects in Sri Lanka, which is one of the most discussed issues in Sri Lankan construction sector. The research follows the qualitative approach with collaboration of industry experts to gather relevant information. Three case studies were employed in the study and withing the cases, expert interviews, document review and observations were used. Accordingly, 11 interviews were conducted with high-rise building experts to obtain the overview and suggestions to implement lean tools in Sri Lankan high-rise building construction and data was analysed using code-based content analysis.

The study revealed delays in the sub-contractor work, inadequate definition of substantial completion, failing to deliver the site to the contractor by the client for initiating site work, changes in the orders and changes from the initial plan, poor site management and supervision by the contractor, underestimation of the construction time frame, difficulties in financing the project by the contractor, unqualified workforce, effects of sub-surface conditions and delays in revising and approving design documentation by the clients as the main causes for the delay in high-rise building construction projects in Sri Lanka. The research further revealed 5 Whys Analysis, Kanban System, Gemba Walks, and A3 Problem Solving. VSM, a tool that visually maps out the entire construction process and supports identifying to eliminate delays in high-rise building construction projects. Moreover, the research outcome recommends that lean culture adoption, collaboration among stakeholders, integration of digitalization in construction processes and systematical implementation of lean tools helps to identify and minimize delay in building construction projects. Furthermore, the research gives the outline for the future researchers and construction professionals to further study on the lean tools and its impact on the Sri Lankan construction industry.

Keywords: Construction industry; High-rise buildings; Lean tools; Sri Lanka

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